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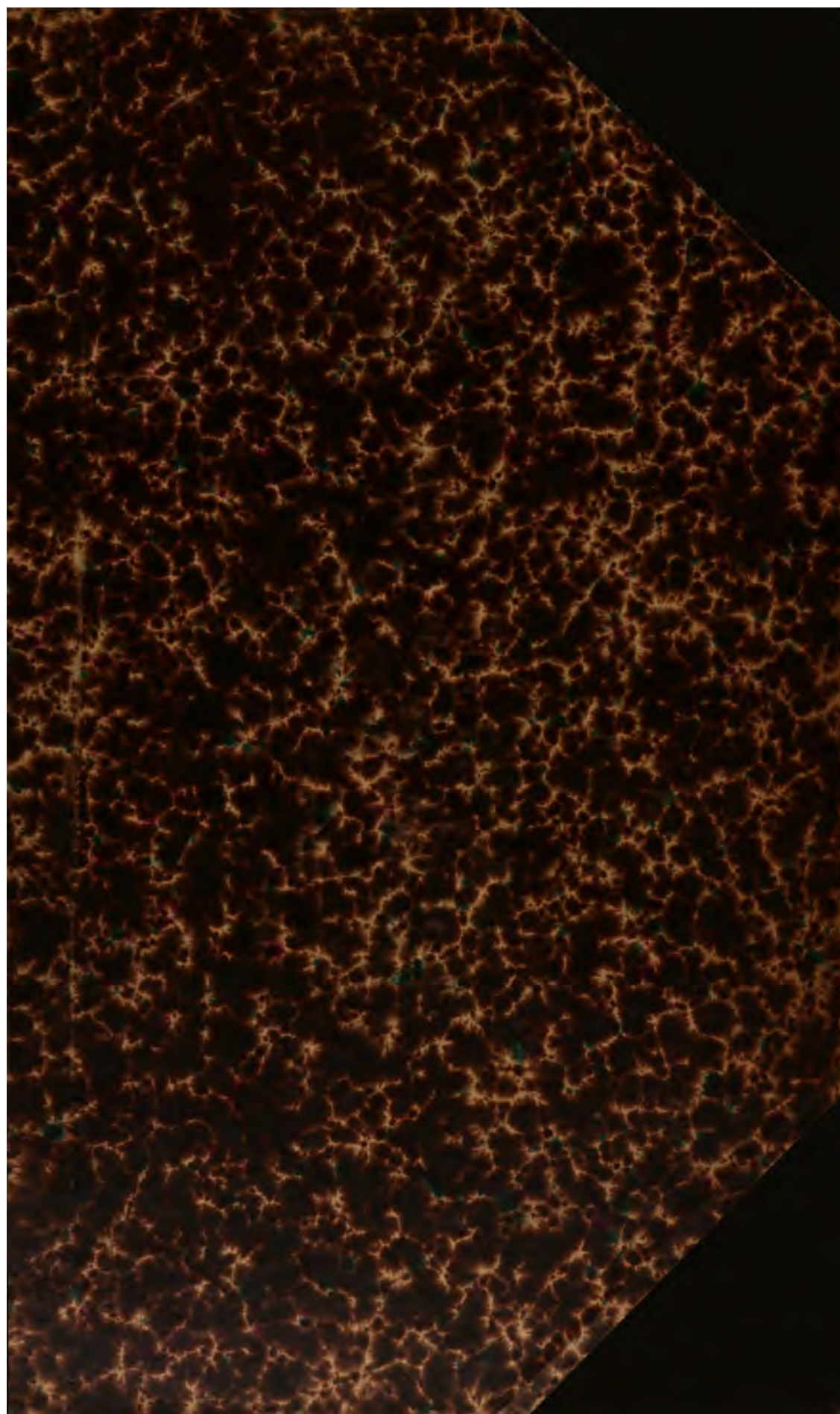
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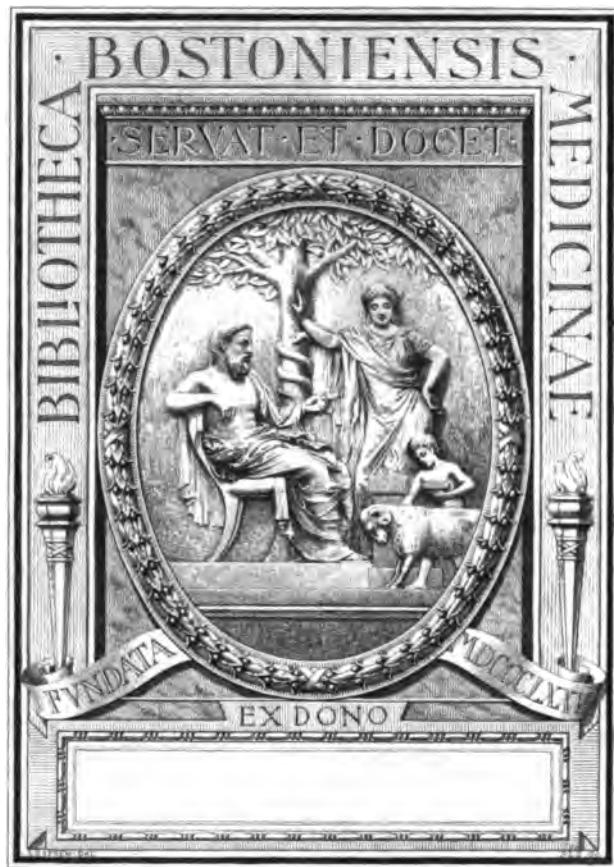
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SUPPLEMENT TO]

[APRIL 19, 1905.

THE
CLINICAL JOURNAL

CLINICAL RECORD, CLINICAL NEWS, CLINICAL GAZETTE, CLINICAL
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*A WEEKLY RECORD OF CLINICAL MEDICINE AND
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IN TWO VOLUMES ANNUALLY.

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THIRTEENTH YEAR.

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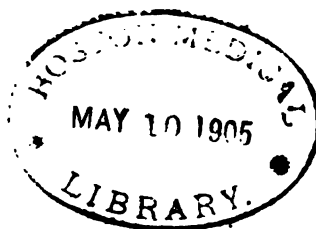
L. ELIOT CREASY, M.R.C.S.ENG., L.R.C.P.LOND.



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ASEPSIS IN THEORY AND PRACTICE.

By W. BRUCE CLARKE, F.R.C.S.,

Assistant Surgeon to St. Bartholomew's Hospital.

GENTLEMEN,—Whilst I think it may be fairly said that we have banished the grosser forms of suppuration from our surgical operations, there is no surgeon that I am aware of who would venture to assert that all his wound cases heal with that absolute freedom from infection that he could desire. There is no need, therefore, to apologise for bringing before you the well-worn theme of asepsis, more especially as I think I may claim that I have something new to say upon this subject.

You are all aware that the pyogenic bacteria are few in number. Most cases of wound infection depend on the presence of *Streptococcus* and *Staphylococcus pyogenes albus* and *aureus*, whilst *Bacillus coli communis* and some allied forms are not uncommonly present, and in rare instances anthrax and tetanus bacilli find their way into our patients' bodies. But the question is not quite so simple as at first sight it appears to be. It is, moreover, complicated by the fact that all members of the same species of infective organism are not equally prolific or equally virulent. We are no more certain what sort of crop they will produce than we are able to predict the kind of crop of fruit we can gather from our gardens. Even if we know the soil and can predict the weather, we cannot be certain of our fruit. And so it is with bacteria. Various conditions, both chemical and biological, promote or hinder their growth and increase or diminish their virulence. Every surgeon must make himself as far as possible acquainted with these conditions if he would steer his cases to a successful issue, and avoid introducing septic material unknowingly into his patients' wounds.

When we are called upon to operate on a patient

who is suffering, say, from a tumour, and in whom the skin over the growth is intact, we assume that the tissues of our patient's body are free from septic organisms, with the exception, of course, of the digestive tract; and we have a right to make this assumption, because if we examine his tissues by any of the known means which are at our disposal, we find that they are absolutely sterile, *i.e.* free from all wound-infecting organisms. I am not prepared to state that no exceptions exist to this statement. In many of the eruptive fevers, notably in typhoid fever, the blood and tissues are invaded by bacilli, which may become the sources of local infection; but these bacilli are usually rapidly destroyed in the body or got rid of by the urinary passages, and can only be regarded in most instances as mere birds of passage.

In cases of general septic infection, streptococci may be found in the blood and tissues generally, and the mere presence of a local abscess containing septic organisms is an undoubted proof that our tissues are invaded from time to time. But notwithstanding these undoubted exceptions, the general rule still holds good that septic organisms do not exist in the tissues of healthy individuals, and thus it is that when a wound heals without any septic organism entering to mar its progress we say that it has run an aseptic course. In this case the term "aseptic" is applied to the result, and not necessarily to the means by which it is produced. I will not waste your time by a dissertation on aseptic *versus* antiseptic methods. Each has its proper sphere and place, and so far as our present knowledge goes, it seems to me useless to pursue this side of our subject further at this present moment. I may fairly assume that every surgeon worthy of the name is desirous of obtaining an aseptic result when he performs an operation, and for my own part I care not whether that end is achieved by heat sterilisation or by the agency of chemicals. All I desire is that my patient shall get well with the least possible risk and the greatest possible speed, and the object of these remarks is to give you my experience of how to achieve that end with the greatest possible certainty.

We have seen that it is reasonable to start with the assumption that the tissues we are about to subject to a surgical operation are free from putrefactive organisms, and if this is so, as Lister long

ago pointed out, our compound fractures ought to heal with as much ease as our simple ones. If they do not, something must be at fault.

Where does the fault lie? Whence comes the source of infection? It is obviously due to the introduction of septic material from the outside. The only possible sources are the following: instruments, sponges, ligatures, dressings, skin of patient or surgeon, the air.

Let us examine them each in turn and apply to them the test of experiment, and we shall soon see where the weak point lies. You know that our excellent pathological dressers are in the habit before each operation of taking cultures from the various materials that we use, from our skins, and often from our instruments. I need not describe it to you in words, because you have many of you acted in this capacity yourselves, and those of you who have not done so must have witnessed the taking of cultures on innumerable occasions, and be quite familiar with the methods which we employ.

Steel instruments.—It is a simple matter to render ordinary steel instruments sterile; they are boiled for a space of ten minutes in water containing about a teaspoonful of soda to the pint. This insures that all vestiges of grease and oil are removed and prevents rust.

Sponges are strongly objected to by some surgeons on the ground that they are difficult to clean. When the following plan is adopted, which we use in St. Bartholomew's Hospital, I have never found them otherwise than sterile:

1. A new sponge should be first beaten before it is placed in water in order to extract as much as possible of the sand which it contains. The remainder must be got rid of by rinsing it in water several times over.

2. Place the sponges in a solution of hydrochloric acid 5ij to 3j of water for twenty-four hours in order to remove all the small particles of shell and other forms of carbonate of lime which they contain.

3. Rinse thoroughly in order to get rid of the acid.

4. Place in a concentrated solution of soda and water.

5. Rinse again several times to get rid of the soda.

6. Place in sulphurous acid 1 in 5 for twelve

hours, and cover up so as to prevent the fumes from escaping.

7. Rinse in sterilised water in order to get rid of the sulphurous acid.

8. Keep in carbolic acid 1 in 20 till required for use.

When a sponge requires to be re-sterilised after use, Nos. 1, 2, 3, which are only needed for new sponges, are omitted, and 4, 5, 6, 7, 8 alone employed.

This is, as you will see, a somewhat long and complicated process, in my opinion too long, and an equally good result can, I know, be attained by far simpler means. All that I do with my own sponges is to throw them into a concentrated solution of boiling soda and water as soon as I return from an operation, and in this I leave them, occasionally stirring them with a stick, for ten or twelve hours, at the end of which time they are in appearance fairly clean. They are then rinsed two or three times in clean water, and put for another ten or twelve hours into a concentrated solution of boiling soda and water, after which they are rinsed in sterilised water and stored in carbolic acid, 1 in 20, ready for use. When this process has been gone through they are invariably sterile. The above process tends to darken the colour of the sponges, but it does them no other harm. You may perhaps ask me how sterilised water is to be obtained in an ordinary house? There is no difficulty whatever in obtaining it. Water which is drawn from the ordinary tap of a circulating hot-water system, which is to be found in nearly all modern houses, is invariably sterile. In our own pathological laboratory it is the source from which we obtain sterilised water. It has been tested hundreds of times and has never been found otherwise than sterile.

Ligatures.—Personally, as you know, I discard as far as possible all ligatures, and employ torsion with ordinary pressure forceps. I learnt this method when I first began to practise surgery, when sterilisation was not in vogue as it is to-day, and I have continued it ever since—firstly, because increased experience shows me that whatever care is bestowed upon ligatures they are sure in some instances to give trouble, and secondly, because it is useless to spend valuable time in preparing ligatures when you can get better results without them. A few may be necessary for tying vessels

in awkward situations, and for uniting the edges of wounds, but train yourselves to use as few as ever you can, and you will never regret it. I limit myself to the use of silk salmongut and catgut. If I were to be limited to the use of one material, I should unhesitatingly give my vote for silk. If one is careful two sizes, Nos. 0 and 3 or 4, are all that are required. Let me explain exactly what I mean by being careful. If you are going to confine yourselves to two thicknesses of silk, you will have on occasions to use them of double, treble, or quadruple thickness, but there is no difficulty in doing so. Used in this fashion, No. 3 silk is amply sufficient for the most refractory ovarian pedicle or uterine stump. Indeed I have used no other in Martha ward for some years past. When used in this way silk is less liable to give trouble than when the thicker and larger sizes are employed.

Salmongut is perhaps less liable to give rise to stitch abscesses than is silk, and hence it is largely employed for the skin. Both silk and salmongut can be readily boiled and, therefore, easily sterilised. Salmongut stands repeated boiling without being liable to become rotten, but silk does not. To my mind the most satisfactory method with silk is to boil it for at least an hour, and then place it in a solution of 1 in 20 carbolic acid, and keep it there for some time, several weeks if possible, before use. Silk which has been treated in this fashion gets darkened in colour and is far less liable to be attended by stitch abscess when it is used for skin sutures.

Catgut has many advantages in certain situations, and though it is quite possible to do surgery without it, it is a great help to us *if it is efficiently prepared* so that we can rely on its sterility. Many methods of sterilising it have been described. I will refer only to two, for both of which I can personally vouch. The first method is the one which we usually employ in this hospital.

1. *Preparation of catgut (xylol method).*—Ordinary commercial catgut is wound around a piece of metal or glass and placed in a glass bottle furnished with a screw-down top. The bottle is filled with xylol, and the top screwed firmly on, after which it is boiled for twenty minutes in an ordinary steriliser.

It is very necessary to see that the screw-down top is firmly fixed, otherwise water will find its way into the xylol and the catgut will be rotten and

useless. After it has been removed from the xylol it is kept in biniodide spirit lotion to which 25 per cent. of water has been added. Where large quantities of catgut are required, a larger apparatus is employed, but the principle adopted is the same as that which I have just described.

2. *Preparation of catgut (Moschowitz method).*—The ordinary catgut of commerce is wound on a reel, and the two ends are secured to prevent unravelling. It is then immersed for eight days in a solution which contains one part of iodide of potassium and one part of iodine to 100 parts of water. Thus prepared, the catgut is ready for use, and can be kept in good condition for at least six months, provided a well-stoppered bottle is employed so as to prevent volatilisation of the iodine. At the time of operation whatever is required for use should be placed in sterilised water.

Dressing.—The last piece of important apparatus with which we have to deal are the dressings, and there can be no doubt that they should be sterilised before being made use of. When I first came to employ the ordinary steriliser, I was astonished to find how hopelessly inefficient were the small sterilisers in common use. It is well recognised at the present time that the most efficient method of disinfection of cotton and woollen fabrics is by means of dry steam under pressure, and the big sterilisers which are employed for bedding, etc., leave little to be desired *if they are properly used*. It is well to make that proviso, as the following incident will show. A short time back a surgeon with whom I am intimately acquainted, desirous of having his dressings, as he thought, properly sterilised by dry steam, sent them carefully done up to the parochial steriliser. Some of his friends rather laughed at him for his trouble, and went so far as to throw doubt on the efficient carrying out of the process; and one of them suggested a simple and easy, if somewhat rough-and-ready, method of testing the temperature to which his dressings had been subjected. An ordinary raw egg was placed in the centre of them, and they were sent to the parochial steriliser, which is usually worked by two decrepit paupers. The dressings were duly returned as sterilised, but the egg was quite raw, and might in due time have produced a chicken. To return to the small steriliser—for remember my object to-day is to show that efficient sterilisation

is within the reach of every practitioner—to my astonishment I found that not one of the ordinary small sterilisers which are sold for the purpose of sterilising dressings could be relied on to produce steam under a pressure of four or five pounds, and that much of the so-called sterilisation of dressings was a mere useless waste of time. The construction of these sterilisers was such that, though they might occasionally be made steamtight under a pressure of five pounds above atmospheric pressure, they



FIG. 1.—The numbers are the same in Figs. 1 and 2.

could not be relied on to stand such a test on two or three consecutive occasions, not to speak of the cumbrous nature of the sterilising boxes which they contain.

I pointed out these difficulties to Messrs. Arnold, who at once expressed their willingness to construct an efficient steriliser if I would design it.

The one which I have here on the table before me is the result of my efforts in that direction; and as I will demonstrate to you, it is efficient, satisfactory, and easy to manage, and can be repaired by anyone who can repair an ordinary tin saucepan.

It occupies much the same space as does an ordinary coal-scuttle, being only just over twenty inches in diameter.

Fig. 1 gives a general view of its appearance, but its general construction will be better understood by a reference to Fig 2, sectional view.

The steriliser consists of an outer casing (17) on the top edge of which rests the steriliser proper.

18 is a small space between the inner and outer wall of the steriliser, where the steam is generated,

The tins which contain the dressings, etc., that require to be sterilised are placed on the grid, and the top is screwed down by the thumb-screws (4). The gas (14) is lighted, and in about ten minutes boiling heat 212° F. is reached. In a few minutes more the temperature has reached 220° F. and the pressure-gauge indicates a pressure of about 5 lbs. By slightly diminishing the supply of gas, it is quite easy to keep the temperature and pressure constant for an hour or more. A quarter of an hour is,

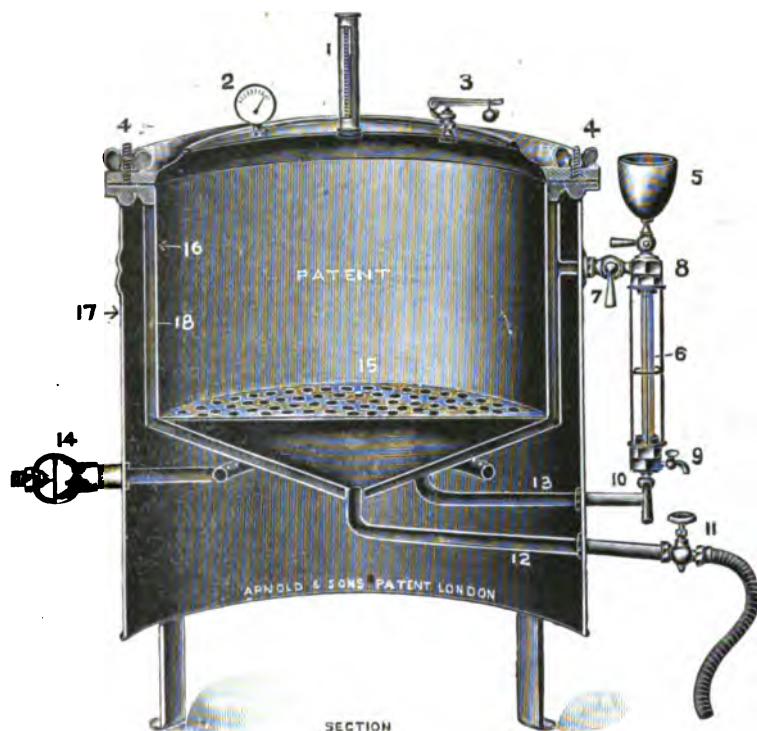


FIG. 2.—1. Thermometer. 2. Pressure-gauge. 3. Safety-valve. 4. Thumb-screw to fix top. 5. Funnel. 6. Gauge-glass. 7. Tap between boiler and gauge-glass. 8. Tap between funnel and gauge-glass. 9. Bottom tap between boiler and gauge-glass. 11, 12. Steam outlet pipe and tap. 10, 13. Pipe to convey water to boiler. 14. Gas-pipe. 15. Grid. 16. Inner wall of boiler. 17. Outside case. 18. Boiler.

and from which it finds its way by some small holes which are not shown into the container or inside of the steriliser, which contains the sterilising kettles. These kettles rest on the movable grid (15). This grid serves a two-fold object: it forms a level floor for the tins to rest on, and provides a space underneath it where the steam may condense and from which space it is eventually drawn off when the screw-down valve (11) is opened.

In order to set the steriliser working, water is poured into it through the funnel (5) at the side, until it rises about half-way up the gauge-glass (6).

however, quite sufficient for sterilisation purposes, as we have proved by experiment.

Let me turn for a moment to the tins in which the dressings are sterilised. They are little else than ordinary round biscuit-tins with a double top and bottom (see Figs. 3 and 4).

The tops and bottoms are both perforated with a series of holes, and the space, about $\frac{3}{4}$ of an inch, which separates the two tops and two bottoms from each other is filled with cotton-wool. The conditions, therefore, that obtain in these boxes are almost analogous to those which exist in the

ordinary culture-tube; and whilst these boxes are in the steriliser superheated steam passes easily through them from end to end. Their construction will readily be understood by a reference to Fig. 4.

I will now point out to you in what special points this steriliser is an improvement on those of similar size which are in general use.

1. The method of fixing the top on insures that there shall be a steam-tight joint, instead of one which is constantly leaking.

2. The lid is fitted, not only with a thermometer, but with a pressure-gauge, which indicates the steam-pressure to which dressings, etc., are subjected.

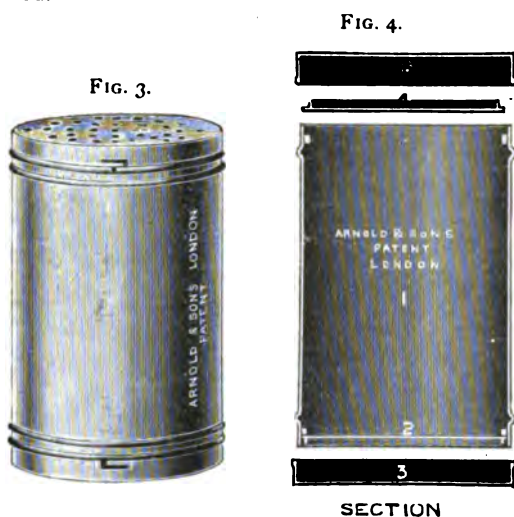


FIG. 4.—1. Space for dressings. 2. Fixed inner perforated bottom. 3. Movable outer perforated bottom. 4. Movable inner top, similar to fixed bottom (2). 5. Movable outer top, similar to movable bottom (3).

3. The safety-valve is worked by a weight, and not by a spiral spring. The spiral spring which is used in the ordinary steriliser soon rusts and gets stuck, and does not act. This one is fool-proof.

4. The stop-valve (11) on the steam outlet pipe prevents the steam from escaping uselessly into the room, and so contributes to raising the steam-pressure inside.

5. All the joints and unions of pipes are so arranged that any person of ordinary intelligence can take the whole steriliser to pieces, clean it, and if necessary, get a leak mended by a local tinker.

6. The sterilising tins are of such a size that whilst they are quite large enough to contain an operating coat or apron, they are small enough to

put into a hand-bag, and as they are plugged with cotton-wool like an ordinary culture-tube, their contents will keep pure for an indefinite time.

By employing these tins it is possible to sterilise coats, aprons, dressings, etc., at home, and carry them in an ordinary hand-bag to a nursing home, or to a patient's house, without any possibility of contamination by the way.

Sterilised dressings may thus be brought in their own tins to a patient's bedside, and not opened until his wound is ready to receive them, and tins can be provided of such a size that each patient can have his own tin, which is only opened when his wound requires dressing.

Sterilisation of the patient's skin, as well as of that of the surgeon, is no doubt important, if it can be carried out satisfactorily, but this is an important proviso. I am quite certain that many of the methods in more or less general use tend to defeat their own object, which after all is to get the patient's wound to heal with the least possible disturbance. If we are to make skin absolutely sterile, it must be subjected to very vigorous scrubbing, and then soaked for some hours with a powerful antiseptic. We have all tried this plan, and have produced at times a laceration of the epidermis and a crop of pustules, which has necessitated delaying the operation for several days, and has caused infinite discomfort to our patients.

The surgeon who scrubs his hands in too powerful antiseptics will equally defeat the object he has in view. He may make his hands absolutely sterile on some one occasion, but he will effectually prevent them from becoming sterile or anything approaching it for some time afterwards, because he has roughened and cracked them to such an extent that they form an excellent resting-place for every species of dirt that comes in their way; and if he needs it, culture experiments will soon show him that some time must elapse before he can again call his hands sterile. I do not know whether you remember, but I certainly do, that Dr. Andrewes asked me about this time last year to try the effect of ammonium persulphate on my hands. Its germicidal strength was undoubted, and it was supposed to be harmless to the skin. At first it undoubtedly was harmless to my hands, but after using it on two or three occasions, I suffered to such an extent from eczema and intolerable itching of the fingers, that I had

to discard it, and my hands did not resume their normal condition until I had been for some little time on my holiday.

The fact is, that however desirable it may be, it is not necessary to make the skin sterile so far as the practical result which the surgeon aims at is concerned. If it were so, much of our surgery would be impossible. Think of the hundreds, nay thousands, of emergency operations in the shape of herniæ obstruction, etc., in which an operation has to be performed without any of the elaborate precautions for skin sterilisation which some surgeons regard as absolutely essential. Most of those cases which recover from these operations of emergency do so with quite as much, if not more, immunity from suppuration as do others whose skins have been elaborately prepared beforehand. Indeed, so impressed have I been with the fact that suppuration often supervenes in those cases in which elaborate attempts at skin sterilisation have been carried out, that I have gradually given up these methods. The suppuration is not of a severe type, but it is quite sufficient to prevent the occurrence of union by first intention, and it usually prolongs the convalescence, even though the temperature is as a general rule scarcely, if at all, raised in such cases. I have often discussed these cases with other surgeons, and I find that most of them hold the same opinions as I do on the subject.

But in proportion as I have adopted simpler means of purification have I found my cases of slight suppuration and stitch abscess diminish, and particularly has this been the case in my private patients, the details of whose dressings, etc., come more immediately under my own personal care than do my hospital cases.

The plan which I adopt is as follows: The patient has twenty-four hours beforehand a good hot bath and the part to be operated on is well washed with soft soap and water, which is subsequently rinsed off with plenty of water. A few hours before the operation the part is again washed with soft soap and water and rinsed with water afterwards. A dressing of any mild antiseptic is then put on, for preference gauze soaked in carbolic acid 1 in 100, in concentrated boric acid, or izal 1 in 500. At the time of operation the dressing is removed and the part well rubbed with a swab (not with a nail-brush) first with ether and then with the antiseptic I am about to use, which as

you know is generally izal 1 in 180. Shaving is of course employed where necessary.

My own hands I prepare in a somewhat similar fashion. First I cleanse them with turpentine, sometimes with a mixture of turpentine and paraffin, which is a remarkably efficient cleansing medium, and not liable to injure the skin if it is well washed in soap and water afterwards. After well washing in hot soap and water, I sterilise my hands in strong izal 1 in 100, and if I have been obliged to handle anything of a very septic nature I never fail to use pure izal well rubbed in for a minute or two, which though it makes my hands tingle for a while, never injures my skin.

One is often asked should rubber gloves be worn. I have tried them and find that they interfere so with my sense of touch that I unhesitatingly say, not as a general rule. If in the middle of an operation it is necessary to handle some septic material, they may be useful, but I generally prefer to have a good wash-up after handling such material instead. After my operations are completed I generally rub a little lanoline ointment and vaseline into my hands, which helps to keep the skin soft and supple.

The air is the last source of infection which we have to consider, and I do not think it has received all the attention which it deserves. In the earlier days of aseptic surgery, before the distinction between pathogenic and non-pathogenic bacteria was as clearly understood as it is at the present day, it was assumed that wounds were usually infected through the air, and the spray was introduced in order to avoid this source of infection. By degrees the fact was demonstrated that the air was mostly free from pathogenic organisms, and that the spray was powerless to kill those that were present. A revulsion of feeling took place, the spray vanished, and infection by the air was supposed to be a negligible quantity. More recent investigations are tending to show that the air *may* prove under *certain conditions* a source of infection.

What are these "*certain conditions*"? In order to find an answer to this question we have but to refer to Dr. F. W. Andrewes' investigations into the air of the tube railway, which I have already alluded to in my pamphlet, 'The Meaning of a Modern Hospital.' He there says: "No pathogenic germs other than those commonly present as

saprophytes upon the normal body were detected in such small volumes of air as could be admitted to analysis under the conditions of the investigation." Again: "The number of micro-organisms found was high in proportion to the concentration of human traffic," etc. The explanation of this latter statement is strikingly confirmed by Koeniger's experiments,* which clearly indicate the possibility of infecting others with one's breath. Gordon, who has been working with Dr. Klein in our own hospital, has referred to these experiments in a paper entitled "The Cause of Return Cases of Scarlet Fever,"† and gives an excellent *résumé* of Koeniger's experiments in the following words:

"Koeniger's method was to wash out his mouth with an emulsion of *Bacillus prodigiosus* (an organism readily identifiable because of the red coloration of its colonies), and then to speak aloud, sneeze, etc., in a room where a number of agar-plates had been set at various distances and at various levels. The possibility of *Bacillus prodigiosus* being already present in the air of the room was excluded by control experiments. The results which he obtained are very striking. In one experiment by reading aloud for half an hour infection with *Bacillus prodigiosus* occurred up to a distance of twenty-four feet, and in another experiment infection was produced up to a distance of forty feet by coughing and sneezing."

These experiments show how real is the possibility of air-borne infection occurring indoors from the dissemination of particles of mucus from the mouth.

The outside air is for all practical purposes quite pure enough for surgical demands; but these experiments show that *the fouling of the air of any building depends largely on the human beings who inhabit these places, and by far the greater portion of the impurities are derived from the human breath.*

Quite recently our surgical registrar, Mr. Gask, has carried these investigations a stage further, and has taken cultures over extended periods of the air of our operating theatres under varying conditions. He has spread his net for a longer period at a time and as a consequence he has caught more bacteria. He has investigated the fauna of the theatre on a Sunday morning, on occasions when it has been out of use for some twelve hours or more, though

the outside air has had free access to it through the windows. At such times it contains air as pure as the outside air, and is practically clear of pathogenic organisms. But when it is being used for operations, and surgeons, nurses, and students have free access to it, the pathogenic fauna speedily invades it, and pathogenic cultures can be caught on the various culture media which he has employed.

It is difficult to see how these pathogenic organisms can be excluded unless those who are to do the operations are excluded as well.

Two points, however, we may store up for reflection. First, what we want to get into theatres and operating-rooms is the pure air from the outside, and that there is no need of plenum ventilation, in which system the outside air is washed and pumped in through passages which are certain to get foul in time. This system is based on an entire misconception of facts. Second, that at present we have not found a means of ridding the air of a room of pathogenic organisms, because they are brought in by the human beings who come there. If these organisms are there, they may, and probably do, fall into our operation wounds. We can only wash them out or prevent and inhibit their growth when they get there.

Acting on these conclusions, you may have observed that I have taken to swabbing out my wounds just before I close them with a sponge soaked in a strong solution of izar, about 1 in 30. I have found no harm result from such a method, and as I am using a chemical which is nearly equal in germicidal strength to pure carbolic acid and yet is practically unirritating, I may fairly claim to be destroying any pathological organisms that may find their way from the surrounding air. Anyhow, I am sure that such a method is improving my results and helping to obtain union by first intention.

I have endeavoured to put before you the possible sources of infection in any surgical operation. If you appreciate them, you will be forewarned and therefore forearmed. Do not forget that elaborate culture experiments are daily performed in our pathological laboratories, and they rarely, if ever, fail from outside contamination. Why? Not because the places in which they are performed are models of cleanliness and flooded with fresh air, but because the culture media are only exposed for a short period. I doubt not that you often fail in getting good surgical results because, owing to not having everything ready, you leave your wounds exposed whilst you are searching for the needful apparatus.

Cultivate cleanliness. Be orderly. Make up your mind exactly what you want, be it instruments or dressings, before you start. If you adhere to these principles, you will become in time good surgeons.

* 'Zeit. f. Hygiene,' Bd. xxxiv, Heft. 1.

† 'Brit. Med. Journ.,' 1892, vol. ii, p. 445.

SOME COMMON ERRORS IN THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE EAR.

By J. DUNDAS GRANT, M.A., M.D., F.R.C.S.,

GENTLEMEN,—On looking at the title of my lecture to-night, I am comforted to think that the first word of it is "some;" because as I am only expected to detain you for three-quarters of an hour, if I were to enlarge upon all the common errors, especially those I have committed myself, the time would not be nearly sufficient for the purpose. But I think, however, I may be able to refer to a number both of those I have committed and those I have seen committed by others, and I shall be very much surprised if you have not, most of you, committed some or other of them yourselves. By reviewing them in the proper spirit we may hope to be spared from making them in the future as often as in the past. Some of these errors are of comparatively slight importance, but others are of the greatest seriousness as leading to the utmost danger to patients' lives.

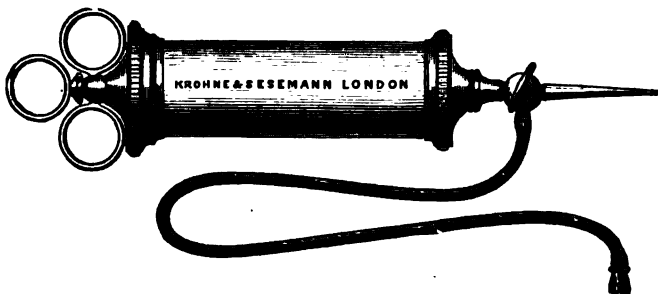
To begin with one of minor importance, that common affection of the ear, impacted *cerumen*; errors are not unfrequently committed with regard to it. Naturally enough when you see in the meatus of the ear a great brown mass, it is not very difficult to make the diagnosis. It was once expressed by somebody who ought to have known better that there were two classes of ear disease—those cured by means of the syringe, and those that were not. He referred chiefly to impacted cerumen.

The meatus of the ear is rather a tortuous sort of passage; there is an isthmus at about the junction of its inner and middle third, and a mass of cerumen may get impacted beyond that and become very difficult to dislodge; in point of fact, with the syringe which is generally employed by the average practitioner of medicine, it is surprising to me that the masses of cerumen that I meet with are ever dislodged at all. I show you here a typical syringe (Fig. 1) used by specialists; it has a very fine point; the ordinary aural syringe has a bone or ivory tip, not much thinner than that of the little finger, and when it is introduced into the external auditory meatus, it tends to plug it up altogether and to offer an obstacle to the reflux of the fluid

which is to bring out the cerumen with it. Thus, not unfrequently, the effect of it is to drive the mass from the wide part of the meatus into the narrow one, the isthmus, or even beyond it. Then comes the question of dislodging it. The error sometimes made is to tell the patient, after syringing the ear, that nothing has come out, and there obviously was nothing in, and that it was not a case of cerumen. Then the patient gets into some one else's hands, who perhaps makes a more careful examination with the speculum, and finds a mass of cerumen there after all. I have seen that from time to time, and I need hardly say that some cases on which one's reputation is founded are "brilliant results" obtained by syringing out an impacted mass of cerumen.

Now, for the avoidance of these errors, I should strongly advise those who have not made themselves familiar with the use of the forehead mirror

FIG. 1.



to do so; it is quite worth while, because in addition to it being of great use for the ear and throat, it may be employed for various other examinations where the light is not to be depended upon, and where the examination has to be conducted through speculums of one kind and another. You may say it is the simplest thing possible to see cerumen in the ear, but I assure you I have seen cerumen form a kind of diaphragm in the deep portion of the auditory meatus and reflect the light so remarkably like the *membrana tympani* that a good practitioner has been mistaken by its appearance and thought it to be the *membrana tympani* itself. Of course the practised eye of a specialist would scarcely be deceived, though he might think it was one of these curious diaphragms sometimes formed in the meatus, but the slightest touch with a probe (a very useful instrument for examining the ear is a fine probe round the tip of which is put a little cotton-wool) can do no harm and will

detect this diaphragm of cerumen. Occasionally one sees the membrana tympani plastered with cerumen, especially when forcible syringing has been practised and no cerumen dislodged.

There is another mistake sometimes made, in which something which is not cerumen is taken to be such; and I may briefly mention that there is a disease of the external surface of the membrane and of the lining of the external auditory meatus, in which desquamation takes place, and layer after layer of epidermic scales are thrown off; these accumulate and compress each other, and in the centre undergo fatty degeneration; the appearance is that of a plug blocking up the external meatus, and if you do not know of any other plug but cerumen you are apt to think it such; it is what is called an external cholesteatoma, the result of *desquamative external otitis*. When you look at it it resembles cerumen, except that it is too light in colour and too irregular on the surface; if you proceed to syringe it the moisture causes the cells to swell up and it gives the patient great headache. If you take an instrument for the purpose of detaching it from the side of the meatus, this causes a good deal of pain, which is inevitable because the outer layer of the plug is the inner layer of the lining of the external meatus. This sometimes goes under the name of "keratosis," and I have seen it treated as cerumen by persons of very considerable eminence. We have one drug at least which has the faculty of dissolving epithelial cells, namely salicylic acid, and such drops as the following are fairly good for the purpose: 10 grs. of salicylic acid, 3 drs. of rectified spirit and 5 drs. of glycerine. In these particular cases these drops have an excellent effect in softening and breaking down the masses and making it much easier to remove them in perhaps a couple of days. This has generally to be done by means of forceps, and you will probably find that you pull out a kind of cast of the external auditory meatus.

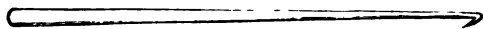
A somewhat uncommon occurrence, still a very distressing one when it does take place, is the growth of *epithelioma* in the external auditory meatus. To call this a "common error" would be straining matters somewhat, because it is an uncommon occurrence; but mistakes are made through not recognising it, and I cannot tell you how difficult it is to recognise it early enough. I will give you a sort of idea of the case. I have seen

it looking like simple and ordinary granulations on the posterior wall of the external auditory meatus. You get a sort of foreshortened view, so that you do not see the ulcer right face to face, and I assure you it is the most difficult thing to diagnose. By keeping it well before one's mind, one sometimes recognises it at once; at other times one only suspects it, but if you do not keep it before your mind you are pretty sure to pass it over altogether. It is only by microscopical examination that its nature can be decided. A case referred to me some time ago presented just the characters of granulation in the posterior wall of the meatus, but the peculiarity was that it had lasted for some six months, and all that time the patient had been subject to pain shooting up the side of the head and down the neck towards the shoulders. It is unusual for simple granulations in the external meatus to be accompanied by such symptoms as these. Although I suspected it, I did not make the diagnosis, and I was told that a portion of the tissue had been removed some little time before, but it had not been submitted to microscopical examination. There was nothing else beyond this little granular surface. I recommended it to be treated with astringents, and if in a very short time great improvement did not take place I was to proceed again to remove a portion for examination. I saw it a little later than I hoped, and on section it was found to be epithelioma. If I had detected it at an earlier stage, the operation would probably have been more successful; as it was, I removed all the disease. I am sorry to say that since this recurrence has taken place in the neighbouring glands. This disease is a thing to keep in mind, as you are sure to meet with it sooner or later, and you will find it very difficult to avoid making a mistake and to detect it in time for successful operation.

With regard to *foreign bodies*, those you are constantly coming across. Remember not to believe in the presence of a foreign body until you have seen it; do not be guided by a probe, because the most fallacious feelings are produced by a probe in the ear. I have touched thin masses of cerumen on the floor of the meatus, and they have been so hard that I should have been quite convinced there was a sequestrum of bone or a stone of some sort inside the meatus. The mistake made with regard to foreign bodies is trying to take them out with

forceps : of all the instruments at our disposal for the purpose, a forceps is the most certain to fail. There is, it is true, a very fine pair made with detachable blades, which are introduced one above and one below the foreign body, but they do not often act well. When a foreign body is found in a child, the great thing is to give an anæsthetic. Of course many foreign bodies will come out with syringing, but a great many will not. You must, however, be very careful in trying to remove the foreign body with an instrument, because if you fail to get it out you probably irritate the skin of the external meatus to such an extent that it swells up and makes the subsequent removal infinitely more difficult than it was before. It is to be kept well in mind that the direction of growth of the skin of the membrane and external meatus is outwards towards the meatus ; just as your nail grows upwards so this skin grows in that direction (we have seen little cicatricial points on the membrana tympani gradually work their way up on to the roof of the meatus). This has the effect that sometimes a foreign body in the meatus that you have been unable to remove yourself is worked out to the orifice. I have, at the hospital, spent a great deal of time and trouble to extract a foreign body, and have told the mother to bring the child again in a week, ordering her to use some lead drops. The mother comes back in a week with the foreign body in her hand. You ask how it got out. "Oh, it was just at the opening, and I got it out with a hairpin." The fact is that there is this tendency to spontaneous extrusion, and if a foreign body is not likely to do harm—for instance, a bead or a little pebble—it is better to leave it alone, or at least not to be in too great a hurry to get it out, and allow the inflammation to subside. If you use an instrument for the removal of a foreign body, it should be a very fine one, and used, as I say, under an anæsthetic. I myself employ an instrument like an exaggerated crochet-hook (Fig. 2) with

FIG. 2.

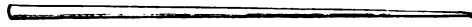


a very sharp point, and it should be put in an angular handle so that you may know which way the point is projecting. Another instrument (Fig. 3), which has also a very sharp hook, serves for this purpose and for other purposes as well ; it can be coaxed beyond the foreign body, turned

round, and the foreign body is gently rolled out by means of it.

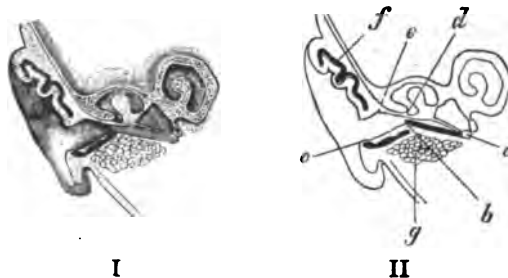
I am going to give you a little hint which you may find very valuable. I daresay you all know the extreme difficulty of examining the interior of the ear of an infant or very young child. You

FIG. 3.



must recollect that in the infant the tympanic membrane is more horizontal than it is in the adult, also that there is no osseous meatus (Fig. 4). The rule in *examining the ear of a young child* is to pull the auricle downwards and backwards. You know how anxious you are when a child has the symptoms of meningitis to make out whether these are due to inflammation of the middle ear. You look into the child's ear and see the posterior wall ; you may say that it is slightly congested, but you cannot say more than that. You may not realise that, instead of pulling the auricle upwards and backwards, you should pull it downwards and

FIG. 4.

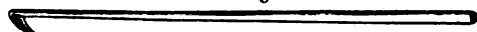


backwards. You will then be surprised to find how good a view you get of the tympanic membrane—even in a very young infant—if you follow this rule.

You are sometimes led to suspect that there is mastoid disease from the presence of *redness and infiltration over the mastoid region* when it is simply due to extension *from a furuncle*. The furuncle, as a rule, fills the meatus, and is, of course, associated with great pain ; sometimes the inflammation is so severe that behind the auricle there is swelling and sufficient infiltration to make you think there is disease of the mastoid process itself. This is to be relieved by recognising the condition and incising the furuncle. I have a little knife (Fig. 5) for the purpose, which will give you greater confidence in opening these. It is so shaped that the point is

directed towards you. You stick it into the furuncle and cut outwards, so that you have every confidence that you are not going to damage the deeper structures, whereas, if you stuck the knife in and pushed it inwards, you might feel some anxiety in case it slipped and you punctured the tympanic membrane. This, of course, with the staphylococci of furuncles, would be very distressing. It is sometimes difficult to tell whether the inflammation is due to middle-ear suppuration or to external otitis, but you can often make this out

FIG. 5.



much more clearly by cocainising the meatus slightly, then taking a probe coated with wool and pushing the soft swelling to the side, so that you may see sufficient of the membrane. Another way is by Politzerising, which will sometimes tell you at all events whether the membrane is whole.

With regard to acute inflammation of the middle ear, a mistake often made is to apply warm *remedies that are not aseptic or antiseptic*—onions and warm oil among other things. If the oil has been sterilised by being thoroughly boiled I see no particular objection to it; but if people would only use such drops as carbolic glycerine of the strength of 1 in 20—that is, glycerine of carbolic acid 1 drachm to 3 drachms of pure glycerine—they could do no harm, and could only do good. These should be put in the ear warm; the carbolic is an antiseptic, and the glycerine tends to give rise to osmosis and draw the liquid from the middle ear through the membrane itself. I cannot too highly recommend these. It is important also to *sterilise the meatus*, so that if the membrane should rupture, it does so into a sterilised meatus and not into one probably swarming with staphylococci.

There is an error of omission of which some are too often guilty, that is to *allow a suppuration in the middle ear to continue*. You know all the possible dangerous complications of chronic suppuration in the middle ear (not to say but what acute inflammation has sometimes very serious complications); we must do all we can to prevent an acute case from becoming chronic. The life of a person with chronic suppuration is very seriously handicapped, and if an acute suppuration of the middle ear goes on for over six weeks, quite apart from any other symptoms at all, you may be fairly

certain that there is suppuration in the mastoid antrum and cells (Fig. 6). This is often overlooked if one may judge by the large number of cases of chronic suppuration of the middle ear that comes before us. When inflammation takes place in the aditus leading from the attic of the



FIG. 6.—The tympanum, antrum, and mastoid cells from an injected specimen.

tympanum to the antrum, it is very difficult for the matter in it to escape; the passage is like the narrow neck of a flask, and that neck is made still narrower by the inflammation; the reason that suppuration exists for over six weeks is because it is pent up in this place. By opening these cells judiciously—which is not a difficult matter—you may often bring about healing, with a complete restoration of hearing power, and save the patient from the dangers of chronic suppuration of the middle ear. Sometimes suppuration is allowed to continue because its seriousness is not recognised.

There is a form of suppuration of the middle ear in which there is no perforation sound—suppuration from the attic (Fig. 7). This is the upper part of the



FIG. 7.—Pus (depicted black) exuding from "attic" through perforation in Shrapnell's membrane.

tympanic cavity, and inflammation may remain there after it has subsided in the rest of the tympanum. There is frequently no perforation sound on Politzerising. One result of this affection is that we may have the *neck of the malleus*

soldered to the wall of the attic and fixed. In this way the dulness of hearing produced is not remedied by Politzer's inflation and is apt to be looked upon as incurable. This condition can only be recognised by making use of Siegel's speculum. (With this you can see also whether the membrane is relaxed.) If the malleus is quite fixed no benefit is produced by Politzerising, and if the membrane is relaxed it only makes matters worse. This brings me to a very important point which is well worth consideration, namely, *relaxation of the membrane*. Imagine that the tympanic membrane is extremely thin—reduced to the tenuity of goldbeater's skin—and that there is Eustachian catarrh. On looking at such a membrane (Fig. 8), it appears often as if most of it were gone, but if it is inflated by Politzer's method or sucked out by means of Siegel's speculum the relaxed portion protrudes like a bladder (Fig. 9). This condition is caused by the membrane being continuously drawn



FIG. 8.—Relaxed membrane indrawn.



FIG. 9.—Relaxed membrane blown out.

upon internally as the result of the absorption of air from occlusion of the Eustachian tube. You find it very frequently in cases of long-standing middle-ear catarrh which has arisen from inflammation of the Eustachian tube; inflation at this stage makes the condition worse and worse. I have seen over and over again that the practitioner has been using Politzer's method and getting a momentary improvement. This process is of the utmost value, and every one should be able to use it in the numerous suitable cases; but it must not be continued too long—only so long as it continues to produce progressive improvement. The main symptom of relaxed membrane is that the improvement on inflation disappears almost immediately. If Siegel's speculum is used it can be diagnosed at once. The treatment for this condition is to pass a bougie through the Eustachian catheter, and in that way get the Eustachian tubes pervious; apart from that you can apply astringents with a bent brush to the Eustachian tubes, and there is an actual way of tightening the loose tympanic membrane, namely, by painting it with contractile

collodion by means of a little probe on the surface of which is twisted some cotton-wool; the collodion to be used is the pure liquid containing no castor oil; it is most important not to use the flexible collodion because it does not contract, and the object we have in view is to effect contraction; the application may have to be repeated at intervals of about a fortnight, but it certainly leaves the membrane tighter than it was before.

There is another condition in which inflation should only be produced by means of the catheter. It must be remembered that *inflation of an ear which is not affected with catarrh is injurious*; if a normal ear were frequently inflated it would suffer harm, and where there is an affection of the auditory nerve it makes that worse than before. There is a condition which is very properly termed "sympathetic nerve deafness." If there is a catarrhal affection of one ear, whether suppurative or non-suppurative it does not matter, it in time produces an effect on the nerve of the opposite ear. Under these circumstances you should confine inflation to the use of the Eustachian catheter applied to the originally bad ear.

Inflation should be avoided in another condition of the ear called "sclerosis," in which the deafness

ANKYLOSIS OF STAPES F.N.



FIG. 10.—Microscopical section. F.P. Footplate of stapes. F.N. Facial nerve.

instead of being due to Eustachian catarrh, is caused by thickening and ankylosis of the stapes in the fenestra ovalis, a sort of osteo-arthritis (Fig. 10).

The tuning-fork tests show that obstructive deafness is present, but there is no narrowing of the Eustachian tubes and no improvement on inflation. Under these circumstances inflation should be avoided as it only does harm.

What I have recommended for relaxed membrane I use for loose *cicatrices*. On suction or inflation the cicatrix protrudes into the meatus and is drawn in again when the air in the tympanum gets exhausted. In some cases a cicatrix may be considerably tightened up by the application of collodion. Sometimes more improvement can be obtained by applying an artificial drum on the loose cicatrix over the head of the stapes. The *method of making an artificial drum* is to take a piece of cotton wool, attach a thread round the centre, cut off the thread at about one inch, spread out the fibres of the wool, and double the edges over; this makes a soft elastic cushion which is attached most securely by a thread; the drum should not be moistened with water, because this seems to have a tendency to make the discharge return; if it is used dry it does not improve the hearing to the same extent, but paroline containing 1 gr. of menthol to the ounce is in my experience the most valuable fluid with which to moisten it. The idea is to place it over the head of the stapes so that the sound waves are conveyed straight to this bone. The patient who gets the knack of using it himself will be grateful to you for ever after.

Another error has regard to the use of *pilocarpine* in nerve deafness. For many years it was the custom to submit cases of nerve deafness, whether congestive or anæmic, to a course of pilocarpine. If one thing is more depressing than another, it is pilocarpine; and if used for a depressed anæmic patient, it only makes him more depressed and still more anæmic. In cases of congestive nerve deafness there is no question about it that some degree of improvement of hearing and diminution of noises is produced by pilocarpine. It was, however, a great error that pilocarpine should have been used in such a routine way as was done some years ago.

One of the most dangerous diseases of the middle ear is what is called "*cholesteatoma*" (Fig. 11). It is a condition of the cavities of the middle ear in which desquamation is taking place, and the mass of cells as it enlarges tends to eat its way through the surrounding bone to the meninges, the brain, or

the lateral sinus. If you use watery drops in a case like that, you make these masses swell up all the more rapidly. In such a case spirit drops should be used, as the drying effect of alcohol upon these epidermic cells is very marked. A useful prescription is the following: Boracic acid, $\frac{1}{2}$ dr.; rectified spirits and distilled water of each, $\frac{1}{2}$ oz. I have known patients who were in misery when



FIG. 11.—Tympanum in a case of "*cholesteatoma*." Lower part of membrane lost. White mass of desquamative products protruding downwards from "attic."

any watery drops were put into the ear, but who told me that when these alcoholic ones were introduced they seemed to "clear their heads."

Eczema of the auditory meatus is not unfrequently met with, and as a rule is fairly amenable to treatment, but on the other hand, we meet with cases in which recurrence takes place again and again. Such cases are not unfrequently examples of *seborrhæic eczema*, and the recurrence has been due to the fact that the seborrhæic condition of the scalp has been overlooked and left untreated. In all cases, therefore, of eczema of the meatus it should be a rule to investigate the condition of the scalp.

I might, if time permitted, have added largely to this list, particularly in reference to the possibilities of attributing the pyæmic disturbances of otitic origin to typhoid, rheumatic, or other febrile conditions. On some other occasion I may have the opportunity of elaborating this part of the subject.

HEINEKE'S studies have demonstrated that the action of radium rays is approximately the same as that of the Roentgen rays. Lymphoid tissue is affected by them through the skin in the same way, but not to the same extent as with the Roentgen rays, unless the radium is brought into close contact, when a brief exposure will induce astonishingly extensive changes in the lymphoid tissue, apparent in a few hours.—*Journ. A. M. A.*, vol. xliii, No. 12.

REMARKS ON "RAILWAY SPINE."

By A. H. TUBBY, M.S.,

Surgeon to the Westminster Hospital.

GENTLEMEN,—What is railway spine? I think if it were said that "railway spine" is "railway brain" it would describe the condition in a word. It is a psychological state, and I should be much more inclined to call it a "traumatic neurosis" than "railway spine"—a neurosis which is followed by symptoms which simulate organic lesions of the spinal column and cord. Notice the word "simulate." It is a question of simulation and not of reality. Under the term "railway spine" is also sometimes included that mysterious disease known as "concussion of the spine." This condition is very rare in itself, and it has never been clearly shown that railway accidents cause it. Sprains arise from them, but there is no evidence to show that railway accidents specially concuss the spinal cord. There are three distinct conditions which are included under railway spine. First, there is a sprain of the back; secondly, there is traumatic neurasthenia; and thirdly, hysteria. In the majority of cases the injury to the back or sprain which follows a railway accident differs not in the least from sprain due to other accidents. The public mind has become well infused with the idea of railway spine, and it has naturally drawn its conclusions. A patient has been in a railway accident and sustains a certain amount of injury to the muscles of the back, with some tearing and consequent effusion of blood into the spinal muscles. He goes home feeling shaken, and wakes up next morning feeling his back stiff; and perhaps he finds he has some hesitation in micturition, or is constipated. He attempts to sit up in bed, and finding his back stiff and painful, his mind at once flies to the possibility that he is in for an attack of paralysis. When the case comes to be thoroughly analysed you will note that though he may have symptoms such as patches of hyperæsthesia about the back, and a little weakness in moving, the examination makes his back in no sense weaker or more hyperæsthetic; and in spite of his loud complaints about the extremely painful spots in the back, he is well able to move the part, especially if you appear not to be looking.

When you have finished with the patient, turn round and ask him to tie his boot-lace. It is astonishing to see how quickly some of these patients will stoop to carry that out. There is nothing in a sprain after a railway accident which is of special nature except the colour which the public give to it. Some of these patients are extremely artful; and I may tell a story about a rogue. You know it is said it takes a clever man to be a thorough rogue, and a clever rogue is often better in the matter of intellect than the man in the street who is not a rogue.

A certain surgeon was called upon by a railway company to examine a man who had been in a railway accident, and this man was said to be hopelessly paralysed—he had loss of power over the bladder and rectum. The surgeon examined the man carefully; and not only in the usual way, but he stuck pins in his legs, which the patient bore without a murmur. The patient stated that he could not retain the urine and fæces. In fact, the man appeared to be a most pitiable object altogether. Shortly afterwards the question of compensation was settled, and the man walked in to see the surgeon and offered to micturate or defæcate in his presence, just whichever he wished. Sprains here are better called traumatic lumbago; and those of us who have suffered from lumbago of the ordinary description know the extraordinary sense of powerlessness that it gives one, and it is upon that foundation that the very great superstructure of railway spine is built up. If the patient is allowed to invalid himself with this condition of traumatic lumbago, he passes into a state of traumatic neurasthenia and makes no effort towards recovery, and is often treated as a paralytic case. He is allowed to lie in bed and brood over his troubles, instead of being made to bestir himself and get about his business, and thus glides into the worse condition of traumatic neurasthenia. He seems quite disinclined to go about his business; he says he is losing power; he tells you that his functions are weaker, that his sexual powers seem to be going, and he wastes and becomes sleepless, has less appetite, and gradually becomes a useless individual. At the same time he will often bring in the question of compensation. If I were asked what is the kindest thing to do for that patient, I should persuade him to get the compensation question settled as quickly as possible. I do not

say this unkindly or with flippant feeling, but the man feels himself weak, and has lost control of himself. He finds himself unable to do that business to which he is accustomed. He tries and has two or three failures, and at the same time he has the worry of the compensation settlement; so that this unfortunate man is in the throes of losing his business, is undergoing examinations by surgeons who may be witnesses on his behalf or for the railway company, and he has frequent interviews with his legal advisers. All of these proceedings recall and emphasise his unfortunate state and render him more despairing and helpless. Worst of all in an action to be fought are the law's delays. But when the question of compensation is settled all his worries are over, and there is a steady improvement in most cases. Still that is not always so. There are many cases recorded in which, in spite of compensation being applied to the healing of the injuries, the patient still continues to go downhill and eventually dies of neurasthenia. So you must not necessarily think, because compensation seems to cure a patient, that his sufferings have been feigned. It is nothing of the kind; it is a question of mental disturbance arising out of the railway accident—the belief that it means paralysis and poverty. He feels he has been within an ace of paralysis, and the whole thing seems to wring the man's withers.

A third group of cases are not neurasthenic; they may or may not have had a sprain, but they have been in a railway accident, and are hysterical from the first. That condition is known as traumatic hysteria. Just after a railway accident such a patient will have an acute hysterical attack; he will weep and cry like a child, or perhaps he goes home well, does his work for a day or two, then fancies he is not as well as he was, lapses into an emotional state, weeps before his wife and children, and show signs of nervous break-down. This break-down, if not properly treated, becomes worse, and some cases show signs of an hysterical condition of the nervous system. They often affirm that they are paraplegic, and apparently they are. They say they have lost sensation, that they have lights in their eyes, that they are deaf, and so on. They also state they cannot sleep at night. It is very difficult indeed to disentangle these hysterical cases from organic ones. You should look for three distinct symptoms, and they

are these: If there be hyperæsthesia present, you may be sure you are dealing with a hysterical case. Hemianæsthesia is invariably hysterical, and you should note the distribution of the areas of anæsthesia. In hysteria it appears in segments from the distal to the central part, and disappears in the order of its onset, *i. e.* it has no relation whatever to the distribution of the nerves. True anæsthesia follows the branches of the nerves. When you see hyperæsthesia and zonal or segmental anæsthesia, you may be sure the case is one of hysteria. I do not think you can place much reliance on eye symptoms, because it is a fact that injuries of the spinal cord do not often cause retinal changes. For instance, in gross lesions of the spinal cord such as those produced by fracture dislocation of the fifth or sixth cervical vertebra and upper part of the dorsal, in only four cases is it recorded that there were changes in the optic disc; and then there was only a certain amount of haziness and cloudiness with blurring of the edge.

Under these three conditions of traumatic lumbago, neurasthenia, and traumatic hysteria, the curious condition of railway spine may be summed up. It is an imitation of an organic condition, and it may result in general loss of nerve power, with a gradual ebbing away of all the manly functions, or it may take the form of a man transformed into a hysterical being, with all the various odd symptoms and signs which they get. In some rare cases when a man's body is crushed, the spinal column is implicated and may even be broken. But then the symptoms are very clear and definite.

READERS of THE CLINICAL JOURNAL who were at the Oxford meeting of the British Medical Association and saw the steriliser designed by Mr. Bruce Clarke will remember that one of the features of this steriliser was the kettle. Until this was suggested by Mr. Bruce Clarke there was no perfect kettle for sterilising dressings, as when dressings are placed in the ordinary kettle the bands with air-holes round them are usually turned so as to admit steam into the dressings. After sterilising the lid of the steriliser is opened, and before these bands can be turned to close the openings round the kettle germs and dust easily get in; whereas with this new form the dressings are placed in the container, which has a fixed perforated bottom and a loose perforated top; a piece of cotton-wool is placed on the top and bottom and a perforated cover is placed on both; it is then put into the steriliser, and after sterilisation is taken out and ready for use without having to open or close any part.

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ON

INJURIES TO THE ELBOW-JOINT.*

By ROBERT JONES, F.R.C.S.Eng.,

Hon. Surgeon Royal Southern Hospital, Liverpool, and
to Liverpool Country Hospital for Children.

MR. PRESIDENT AND GENTLEMEN,—When your Secretary paid me the great compliment of inviting me to address your Society, I thought that I could do no better than introduce for discussion a subject of great practical importance concerning which strong and diverse opinions are held.

Injuries of the elbow concern us all and we have each of us, I venture to think, had our moments of anxiety in our attempts to steer a badly damaged elbow through dangerous seas. In my own practice I meet with a large class of patients, young and old, in search of more useful arms, many of them stiff at awkward angles and some with a limited range of movement in a position which renders the arm of little use. I desire, therefore, this evening to deal with the damaged elbow in its clinical aspect, to emphasize certain points in diagnosis, to simplify treatment, and to warn my medical friends of the dangers which attend the use of splints.

In the old days there was considerable difficulty in testing our diagnosis, and this often led to unwarranted dogmatism on the part of the surgeon, who felt himself in the position of one who could not be contradicted. Even in those days, however, we must have felt in our introspective moments the real difficulties which beset us, and that the anatomical precision with which we described our injuries was hardly justified by the knowledge we possessed. Indeed, the larger our experience, the more exact our knowledge and the less detailed our diagnosis; and we generally left our junior house-surgeon, fresh from the anatomy-rooms, to describe the displaced fragments, the aspect of

* Delivered before the Wigan Medical Society.

facets, the angles of obliquity and the rotatory changes, in cases which to some of us strongly suggested a simple dislocation. The advent of the X rays, however, has changed all this, has added immensely to the accuracy of our knowledge, to the classification of our cases, and has saved our patient from much unnecessary and often aimless manipulation. We must beware, however, that we do not paralyse our diagnostic faculties from pure inanition. Rontgen rays should supplement, not usurp, other means at our disposal. Until we become familiar with common types of elbow injuries, each case should be anæsthetised and our impressions recorded, and if we be sufficiently fortunate to possess a Rontgen screen it may be used to correct or confirm our conclusions. In this way we may educate our powers of diagnosis and become much more competent to do good work in this important branch of surgery. In this connection I must refer to the common fallacy that radiographs are like photographs, and have only to be looked at to be understood. In young children it is impossible in quite a number of cases, despite excellent pictures, to diagnose elbow fractures by means of X rays, and here our tactile education is invaluable. The reason for this is obvious; for at this period the articular ends of the bones are cartilaginous and transparent; and apart from an odd ossifying epiphysis, we merely find a clear space of considerable extent, between the arm and forearm, which certainly may contain fractures, but they are not at all distinguishable in the negative. From this you will note that while we gain in clinical accuracy from radiography, it has its sharp limitations, and, often for its correct interpretation it borrows aid from the clinical side. Even in later life, where apparently the picture is complete, the greatest care combined with much experience is necessary before its lesson can be learned; and very rarely can we look upon X-ray pictures of infantile elbows and say "In this case there will be movement, in this a limited range, in this none." May I say one word in passing, viz., that all students should be taught X-ray work as a part of their curriculum, and that practitioners should no more allow so important an aid to diagnosis to fall into unqualified hands than they should the use of the stethoscope. In this respect our metropolitan colleagues are most to blame; for in spite of the existence of many experts in this department, most

of the pictures that are brought to me bear the names of instrument-makers, electricians, and wholesale chemists. This should all be changed.

I will now touch lightly upon a few points in the anatomy of the elbow joint which may bear upon diagnosis. Important amongst these from their relationship to X rays are the centres of ossification and the fusion of epiphyses. The centre for the shaft of the humerus appears early in foetal life, ossification of the capitellum, or lesser head begins in the third year; it appears in the internal condyle about the fifth year; in the twelfth year in the trochlea; in the fourteenth year it appears in the external condyle, and they all unite together to form an epiphysis at the lower end of the shaft. The lower epiphysis unites to the shaft at puberty, while, as we know, the upper end is detached until maturity. The practical bearing of this is that while we cannot separate our lower epiphysis later than the sixteenth year, our upper epiphysis may be detached up to the age of twenty-one.

The upper end of the radius begins to ossify at the fifth year and is united at the seventeenth.

The coronoid process of the ulna shares a centre of ossification with the shaft. The olecranon has a separate centre and is cartilaginous until eight and it unites at puberty.

Movements.—Normally there is no lateral movement in the elbow joint, but merely flexion and extension, a movement that ranges about 140° . Extension and flexion are limited by the tension of soft structures and not by contact with the respective fossæ of the coronoid and olecranon. The bony structures check forced but not voluntary motion. A point of great practical importance for diagnostic purposes is that if the arm be extended a line drawn from one condyle to the other passes over the tip of the olecranon. This is as useful a line to us as that of Nelaton in the hip. If the elbow be flexed to a right angle the olecranon lies a little more than one inch below and not quite half-way between these two points, being a little nearer to the internal condyle.

While the line of the humero-radial joint is horizontal the humero-ulnar joint slopes obliquely downwards. This fact makes the axis of the extended forearm diverge outwards at an angle of about 6° , giving rise to the so-called carrying angle of the elbow. This angle disappears when the

hand is pronated. The same anatomical fact will account for the pronated hand being carried towards the face in flexion and to the outer side if supinated.

Of the ligaments the internal lateral is the most important and resistant. It limits both flexion and extension and resists lateral yielding. Were it not for the lateral ligaments fractures of the olecranon would invariably exhibit great deformity; but their attachments, more especially of the internal to the border of the great sigmoid cavity of the ulna, prevent a wide separation. In those instances where a wide separation exists we may be sure that the ligaments have been completely ruptured. Of the capsule we need but remember that its two thin aspects are at the front and at the back and that effusions due to sprains present as two pouches each side the olecranon, at the upper part of the radio humeral joint and also beneath the brachialis anticus.

A severe sprain of the elbow seen early is not difficult to diagnose. The joint is swollen, tender, and fixed at an angle of about 55° ; the three bony points bear their correct relationship. There is a fulness at each side of the olecranon and easy gliding movement in the joint within its limited range. All attempts at voluntary movement give rise to pain. Pressure over the lateral ligaments is borne with difficulty. Lateral movements of the elbow may be present due to rupture of one or both lateral ligaments. The condyles, epiphysis, head of the radius, and olecranon are firm.

To recent dislocations I shall make but a reference. They are generally easy of diagnosis and not insuperably difficult to reduce. The points to go for—and they can all be felt—are the condyle, the head of the radius, and the olecranon. In the backward displacement of both bones there is a fulness in front, just below the bend of the elbow. The joint is usually flexed at an angle of about 140° . The head of the radius is very superficial to the outer side of the olecranon and behind the external condyle. The forearm is shortened anteriorly and broadened; in its upper part there is deviation of the axis of the arm, limited flexion and extension, and a varying amount of lateral movement. This dislocation is due to a fall on the hand, and the elbow is thereby hyper-extended, and usually abducted. I have seen it on a few occasions occur in the company of a Colles's

fracture. During hyper-extension of the arm the olecranon presses into the fossa and wrenches the ulna from the humerus; the lateral ligaments are torn and the coronoid process is forced behind the trochlear surface. In this common form of dislocation, which we all know so well, there are often complications; the most common of these are fractures of the olecranon and coronoid, tip of internal condyle, or the head of radius. I have seen cases illustrating each of these accidents.

The other dislocations are less common; they consist of two lateral displacements, a forward variety of a rare kind and an interesting form from the point of view of diagnosis; I mean displacement of the radius forwards. The lateral varieties are rare because of the strength of the lateral ligaments; the backward displacement is common because of the weakness of the posterior part of the capsule; the forward displacement is very rare because of the position of the olecranon.

Dislocation of the head of the radius forward is an interesting injury. We come across it in early days under the name of *subluxation* of the radius. A small child is brought to us with a painful elbow held almost extended and semi-proned. The arm can be freely flexed, but there is some limit to supination. The injury is almost always inflicted by a pull upon the arm, accompanied by abduction or adduction. The mother pulls the child's arm to hurry it along, or swings it over an obstacle, or gives it a sudden tug to lift it out of danger. In this way the head escapes more or less completely from below the orbicular ligament. The more complete dislocation, however, which occurs in later life is often due to a blow from behind while the arm is pronated, to a severe twist, or to a fall on a pronated arm. The head can be plainly felt situated forward and inwards. The three bony points maintain their relationship. There is limited supination. The head of the radius moves with the shaft and flexion at the elbow is abruptly checked. Such an injury is by no means uncommon, and I have frequently come in contact with old cases where the head of the radius is displaced *outwards* and *forward* and where no limitation of movement exists in any direction. The treatment of these cases I will allude to presently.

For all clinical purposes, the classification which

will suit our purposes best may be simplified and tabulated as—

- (1) Fractures of the external condyle.
- (2) Supra-condylar and condylar.
- (3) Fracture of the internal condyle.

Fractures of the external condyle are fairly common. Out of my last tabulated 121 cases of injuries about the elbow, 21 instances of this fracture appeared. The line of fracture fairly closely follows the epiphyseal line; it runs from above the epicondyle into the joint in the vicinity of the trochlear groove, and it carries with it a small portion of the diaphysis. The condyle is displaced upwards, not usually far, by reason of its ligamentous attachments, but one often notes both a rotation and a flexion of the fragment. There is a swelling more especially on the outer side of the elbow, crepitus, mobility, impairment of flexion (impaired movement feared). The relationships of the three points of bone are altered, the transverse diameter on the injured side being increased. This injury is due generally to a fall on the flexed elbow.

Of the internal condyle fifteen out of 121 were found separated. The line often begins above the epitrochlea to the centre of the elbow joint. The ulna is attached to the fragment and both the condyle and the ulna are held in fair position by the radius. The interference with the three bony points is therefore not great. The olecranon maintains its relationship to the internal condyle, and is inappreciably altered in regard to the epicondyle. If there be displacement upward, the carrying angle will be diminished.

Separation of the complete lower epiphysis is unquestionably rare, and of 121 of my cases only one could be positively diagnosed, even with X rays, as an undoubted instance. Eighteen cases are labelled as supra-condyloid fractures, and in most of these the fracture follows the line of epiphysis, but the epiphysis carries with it also some of the posterior portion of the diaphysis. Should it occur it is most likely to do so before the age of three, at a time when it is quite easy to forcibly produce it on the cadaver. In the majority of supra-condyloid fractures, the break occurs above the epiphyseal line. The diagnosis of supra-condyloid fracture is often confounded with backward dislocation of the elbow. In both cases there is prominence at the bend of the elbow, a prominence

of the olecranon posteriorly, lateral mobility at the elbow. In the fracture, however, the three bony points maintain their relationship and crepitus can be elicited on reduction, while displacement is very apt to recur unless the arm be immobilised.

Fractures of the head of the radius are common in my experience. Out of 121 X rays I find ten fractures of the head and two of the neck of the bone. The displacement is usually outwards and forwards and is liable to be mistaken for a small piece of the external condyle. Supination and pronation are both limited, while the elbow can be almost fully extended and flexed.

So much, gentlemen, for the differential diagnosis of these, the main injuries to the elbow joint. If they are seen immediately after injury, the difficulties are not great, but we are all of us likely to make mistakes in the stage of serous and hæmorrhagic effusion. This is the case even when our patient is under an anæsthetic and our examination can be made at ease. Without anæsthesia the difficulties are greater still, and the problems we have to solve are (a) When are we to reduce the deformities, and how? (b) Is there any routine method of treatment which we should adopt until, by X rays or otherwise, our diagnosis may be made more certain? Both questions may be easily and emphatically answered. The deformities must be corrected without delay, and there is a routine method of treatment which should be adopted in all doubtful cases. For many years there has been too great a tendency to fix injured elbows in angular splints, closely applied and firmly bandaged, and but little attention has been paid to forestalling the limitations of movements which the exudation of callus entails. Splints are tightly fixed before the swelling appears; tension is intensified from outside pressure; splints are removed and reapplied, the arm and hand swell, and disturbances of circulation are potent factors in opposition to recovery. In 1892 and 1894 I introduced to the profession the position of acute flexion as a safe routine in the treatment of grave elbow lesions, a position which clinical experience had for years taught me to be productive of almost uniformly good results. In 1894 I wrote:

"Some years ago, feeling dissatisfied with the outer and inner rectangular support then and even now in vogue, I introduced the posterior rectangular thin sheet-iron splint, with the kettle handle interrup-

tion at the elbow. This allowed of a much more careful adaptation of fragments, and was so constructed as to lessen the need of tight bandaging. This splint, which met with a favourable reception at the hands of surgeons, I now very rarely use—indeed, I may say only in those cases of compound fracture with loss of bone where dressings have to be combined with rigid fixation and where ankylosis may be confidently expected. During the time I used the splint I was unfortunate enough to meet with two bad results. The one was a case of condyloid fracture in a boy æt 14, which, at the end of six weeks, seemed fairly ankylosed; and the other in a girl æt. 12, who, at the end of five weeks, after simple backward dislocation with apparently no complication exhibited a moderately firm ankylosis, not attended by limitation or supination or pronation. In the first case I forcibly extended, supinated, then acutely flexed the elbow. I applied a bandage round the neck, and for three or four weeks kept it so without indulging my curiosity to the extent of making an examination. My second case was treated in similar fashion, and both made good recoveries with excellent motion. My object in acute flexion was in the first case to secure for the bones a position sufficiently changed to lessen the risk of a reuniting of old adhesions, and at the same time to attain for the articulation absolute rest after its manipulation. The late Mr. H. O. Thomas, with whose practice I was intimate, advocated a flexed position, a little less than 45° , in the treatment of his tubercular elbows, and his results I have never seen equalled. These results were brought about, I am convinced, by reason of the fact that no constrictions in the shape of splint and bandage interfered with the physiological activities of the joint. This factor of splint and bandage has, in my opinion, much to answer for in the stiff joints which follow injury; a week never passes without my seeing some child several weeks after accident with a stiff and useless elbow. Hardly one of these cases but gives the usual history of rectangular splints, pads, bandage and early passive motions. I used to experience similar results until my observations of Mr. Thomas's tubercular cases led me to adopt the acutely flexed position for all injuries of the elbow, excepting fracture of the olecranon. The treatment I would advocate, then, is that all injuries of the elbow excepting fracture of the olecranon

should be fixed at an acute angle, and kept there until all inflammatory symptoms have subsided. This routine should be adopted whether an accurate diagnosis has been made or not, for I find it is only those gentlemen of very limited experience who never fail to diagnose an elbow lesion."

Ten years have passed since this was written, and my additional experience confirms me in the accuracy of the views I then expressed. Many of my surgical friends at home and abroad have written to me confirming good results, and acute flexion of the elbow is now slowly becoming recognised as a simple and effective way to treat these serious injuries. It is not generally a commendation to describe any method as a routine, more especially when applied to injuries of widely diverse kinds, and I should like to briefly amplify my arguments in favour of acute flexion. My practice, as you know, is largely concerned with fractures, generally old fractures, which are supposed not to have resulted well. Amongst the injuries of this kind deformities and disabilities of the elbow are perhaps the most common of all. The deformities, whether the result of supra-condyloid fracture, separation and rotation of condyle, or backward dislocation, were almost invariably identical. They consisted of flexion of the arm at an angle of about 120° with varying degrees of movement or none at all. On examining the elbow in supra-condyloid fracture, the prominent lower end of the diaphysis assisted by new bone blocked the arm to flexion. In so-called T-shaped fractures diagnosed by careful surgeons similar conditions obtained. In neglected dislocations the etiology of the deformity was obvious. In short, callus exudate, bony displacements, and organised effusions opposed flexion whether the arm were treated by splints in the straight or in the rectangular position.

Recognising this, I instructed my house-surgeons in all cases of fracture and dislocation, with the exception of fracture of the olecranon, to first of all supinate and acutely flex the elbow and not to be content until flexion was secured.

In subluxation of the radius supination and flexion audibly reduces the displacement, and the arm is kept for a week acutely flexed. Should we be dealing with a sprain, no position could be better to secure for it than that of flexion until inflammatory symptoms have subsided. In cases

of separation of the epiphysis or supra-condyloid fractures I again supinate, extend, and flex ; for one can thus effectively combat the backward dislodgement of the epiphysis. It has been suggested by certain writers who follow this method in separation of the condyles and supra-condyloid fractures that the acutely flexed position is liable to produce a forward displacement of the epiphysis. Even if this be so no harm can come of it ; for callus exudation is not obstructive at the back, and there will be no sharp prominence of the lower end of the shaft to do harm in front.

I have often placed the arm in position aided by the Röntgen screen and the position assumed by the epiphysis when acutely flexed has always seemed satisfactory. If the forearm be dislocated backwards, we must extend and supinate and acutely flex, for in this way only can we reduce the dislocation ; and should we be unable to flex the arm we may rest assured by such failure that the displacement still remains. If the radius is dislocated forward and inward, a similar routine is effective ; the supination and extension will reduce the luxation, while acute flexion will maintain it in position. If the fracture be inter-condyloid, the position of acute flexion has this advantage, that it secures for the forearm at once a right of way before exudation of callus and displaced condyles can prove obstructive. Should the injury be separation of the internal epi-condyle, there can be no better way to keep it from the common downward displacement than by acute flexion to relax those muscles which pull upon it. In supra-condyloid fractures, if oblique, the rectangular position does not prevent over-riding of the shaft ; and it is quite possible to only very imperfectly reduce a dislocation of the radius or the forearm, while the limb may be comfortably ensconced at right angles.

At this stage I should like to draw your attention to the production of sham reductions exercised upon old cases of backward displacement of the forearm. As you know, an ancient dislocation of the elbow is difficult to reduce. I have succeeded in a few cases after two months ; I have failed in some as recent as a month. In these cases, however, it matters but little whether one fails or succeeds, for an equally good range of movement can be secured by a sham as by a real dislocation. A patient, young or old, is brought to the surgeon with a history of some months. Both the ulna

and radius are displaced backwards, the arm slightly flexed, with only a few degrees of motion. In making a sham reduction we endeavour to bring the arm into a flexed position for two reasons : In the first place, it is more useful there ; in the second place, the olecranon process is nearer its normal habitat, and the range of movement will be increased. Ether is administered and slowly but forcibly slight flexion is attempted. This may prove difficult and require much power. When a certain degree has been accomplished and the surgeon feels that a fracture might follow more, the arm is fixed in that position for a few days and again an anæsthetic is administered. Quite easily by this time a few degrees more can be attained, and the operation is repeated until at length acute flexion is attained. The arm is then kept in this position for two or three weeks, passive movements avoided, and under suitably applied tests, to be again referred to, the joint is released. Almost equally good results will be recorded in old cases of neglected supra- and intra-condyloid injuries. The method is very gratifying when applied to old and apparently hopeless cases. A very strange complication is liable in rare instances to follow dislocations. I have noticed it in several instances, but can give no adequate explanation. Jonathan Hutchinson described a case in 1899, under the title "Case of Myositis Ossificans following Injury," and another in the same year was exhibited at the Clinical Society by Frederick Eve entitled, "Case of Myositis Ossificans Traumatica." I can show you three radiographs exhibiting this condition which may or may not be analogous to myositis ossificans ; these cases may be mistaken for ossifying sarcomata.

Many years ago after fracture of the external femoral condyle I removed a piece of bone which exhibited all its characters and which the patient insisted had been growing for two years. It was situated in front of the biceps tendon, was only attached by fibrous tissue to neighbouring parts, and apparently there was no deficiency in any portion of the condyle. This was before the advent of X rays. Some five years ago I removed a piece of bone the size of a crow's egg from the front of the triceps, the growth of which followed a backward dislocation of the forearm. In the three cases which I show you on the screen the bony deposits unquestionably followed dislocation and not fracture. I believed that new bone was thrown

out from the torn periosteum and effused blood, but quite possibly the cases represent a local form of myositis ossificans.

An interesting deformity which follows certain fractures is that known as "gun-stock deformity." It is an adduction of the forearm which is apt to follow fractures of the internal condyle and transverse fractures through or above the condyles. It may be so slight as to merely obliterate the carrying angle; it may be so marked as to give rise to a deformity analogous to a pronounced knock-knee. The position of the elbow which possibly best prevents it is the fully extended one, but this position presents so many dangers that it cannot for an instant be recommended. About twelve years ago, when surgeons frequently adopted this method, I had many opportunities of reflecting on its defects. I saw two cases of ankylosis in the fully extended position, and in over a dozen cases I had to remedy by forcible manipulation arms fixed at obtuse angles. Wright had to resect in five cases treated by this method. Other surgeons have reported equally disastrous results. Clearly, therefore, the extended position has dangers of no inconsiderable kind. I have seen unmistakable gun-stock deformity in slight degree following separation of the internal condyle, although in the majority of instances it is associated with trans-epiphyseal or supra-condyloid injuries. The causation is obviously a change in the direction of the line of articulation. Practically the deformity is governed if the elbow be kept sufficiently long in a flexed position for the consolidation of the fracture to take place. I state this from my observation, that cases at the third or fourth week displaying no such deformities subsequently exhibit them after they have freely used their arms. The lesson to be learnt from this is either to keep the elbow acutely flexed in supra-condyloid injuries for four or five weeks or to keep the released arm under observation and correct the deformity when it is first observed. If you question parents regarding it, they generally tell you that for the first two or three weeks the deviation has increased after the arm has been released from restraint. In a very comprehensive article ably contributed to the annals of surgery by Cotton of New York, he described certain experiments on the cadaver with the purpose of aiding the solution of the problem as to the position of the arm. He experimented upon three arms of newly-

born babies whose humeral epiphyses he detached. Speaking of the displaced epiphysis in the first place, he says, "Readily reduced and firmly held in position of acute flexion, much less well in extended position, and only fairly well at a right angle." Of the second case he writes, "Position firmly retained in acute flexion, less well at a right angle or in extension." Of the third case, "Position of reduced epiphysis fairly retained in the straight position or at a right angle, though not without lateral mobility. In acute flexion the epiphysis is sharply displaced forward."

His experiments on the cadaver of a child *æt.* 6 were very interesting. In the first instance he obtained a supra-condyloid fracture. On attempting to reduce the deformity, he found that extension of the arm produced a marked backward displacement. At 135° the same backward displacement. At 90° the fragments were in fair position, but on manipulation, backward, valgus, and rotatory displacements were all possible. In acute flexion there was a definite forward rotation of the epiphysis, but backward displacement and rotation in the direction of valgus or varus were quite impossible. In fracture of the external condyle case 4 (*a*), he states that in this position (acute flexion) displacements are more easily reduced and retained than in the others tried. In case 5 violence resulted in a supra-condyle break, and referring to the acute position, Cotton says, "There was in this specimen no forward rotation and the fragments were as before locked against all displacements." Scudder, in his last edition of 'Fractures', says that experimental evidence, both on the living and dead, "confirmed by clinical experience," demonstrates that the acutely flexed position actually reduces and holds reduced fractures" of the internal epicondyle, of the internal condyle, of the external condyle and T fractures into the joint. "In the acutely flexed position the coronoid process in front, the trochlear surface of the olecranon behind, and the fasciæ posterior and laterally, together with the tendon of the triceps posteriorly, hold the fragments reduced and close to the shaft of the humerus."

Experiments quite as effective, and I think more reliable than those of Cotton, can be made with an X-ray screen. Factors come into play in the living elbow which are quiescent in the dead. I have compared by the aid of a good X-ray tube the

relative advantages of different positions, and I have had no reason to regret my advocacy of the acutely flexed position. I advocate it not merely because good apposition is maintained, but because a right of way is secured to flexion before callus exudation can prove obstructive. This cannot be said of any other position.

To any of us who come in contact with old elbows a remarkable fact must have been observed. Some of the ugliest elbows present admirable movement, while many elegantly shaped joints are practically destitute of it. This is important, and suggests that after all operative methods by means of screws and silver wire may fail to be convincing; and already I have come in contact with an ankylosis following the wiring of fractured condyle, and a very limited range of movement following a wired inter-condyloid break. Both elbows, however, looked well. I find it wise to tell an anxious mother, when I am dealing with an inter-condyloid fracture, that, while good movement may be counted upon, a widened elbow may result. She never hesitates in her choice between a well-shaped elbow with possible marked limitations of motion and a more homely, if more useful, joint.

I have no time to deal with the interesting question of operations for malunited fractures. I have removed obstructive condyles, exuberant callus, the heads of displaced radii and the well-known sharp and prominent overhanging diaphysis in unreduced supra-condyloid fracture. Such operations are often necessary and generally successful. In recent fractures about the elbow, save in compound cases, operations, I am sure, are quite uncalled for. There are, however, certain cases of ankylosed fractures, the result of severe injuries, where the arm is left hopelessly stiff. For such cases nothing short of excision will suffice; but we must bear in mind that a limited range of movement is preferable if combined with strength than free movement with flail tendencies. Herein lies the danger of excisions performed upon sound but deformed elbows.

"How long is the arm to remain in the sling?" Until consolidation is practically complete and until all traumatic inflammation has subsided. In a badly injured elbow this means about four weeks or even longer, in a bad sprain about ten days, in a dislocation a fortnight. The progress of the joint may be tested in a very simple way. Let us

by way of example take the case of a bad condylar fracture. The arm is acutely flexed for a fortnight. The surgeon, at the end of that time, if the elbow looks encouraging, drops the slung wrist a couple of inches and fixes it there. If on his next visit in a couple of days the patient is able voluntarily to raise his wrist back to the point from which it was dropped, all is well. If not, the arm is again acutely flexed. I never adopt very early passive movements, and I am pleased to find that men of large experience in many cities are finding out how much they obstruct Nature by their attempt at hurry. When the joint has recovered and a few weeks have elapsed, then massage and passive movements may be safely advised, and if a nervous child will not practise movements, forcible extension and the application of a splint for two days will meet the indication.

Are my results universally good, *i.e.* perfect, with regard to movement? No! In recent cases they are always good and often perfect. If ankylosis occurs in children, it is due to faulty surgery and the vicious union of fragments. Passive movements could not influence the result. In trans-condyloid and supra-condyloid fractures there may for many months be a limitation to complete extension. If appropriately treated, flexion is assured from the first. You will do well to tell parents this and save them from discontent.

Let us remember, however, that the range of movement after elbow injuries in children will increase for many months, and elbows which many weeks after injury possess but few degrees of motion may in months exhibit almost complete mobility.

The method of reduction I recommend has at least the merit of simplicity; it requires no expert knowledge, it is not dependent upon X rays, and I venture to urge that, more important still, it will yield good results.

MEDICAL men who wish to administer lithium citrate in conjunction with urotropine will find Burroughs and Wellcome's "Tabloid" lithium citrate and urotropine, effervescent, an excellent preparation for the purpose. Each product contains lithium citrate, gr. 5; urotropine, gr. 3; effervescent basis, q.s. It will be recognised that as in most cases it is desirable to administer a combination of this nature in a good draught of water the effervescent properties of this product are advantageous.

A LECTURE ON RINGWORM.*

Delivered at the Polyclinic

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GENTLEMEN,—In addition to bacteria (cocci, bacilli, spirilli) certain organisms belonging to the lower fungi can be parasitic in man and excite diseased processes. Thus certain yeasts have been observed, amongst which perhaps are to be included those exciting the fungating tumours, known as *botryomycosis*, arising after the operation of castration in the horse, and sometimes observed on the surface in human beings; also those producing the remarkable lesions, so much studied of late in America, called *blastomycosis*.

Ranking beneath them come the *streptothrixes* or *oospora actinomyces*, which cause the suppurating tumour-like formations known clinically as *actinomycosis* and *Madura foot*.

Below these again, but of uncertain position in classification, comes the so-called *microsporum minutissimum*, the parasite of the ringworm-like eruption met with in the femoro-inguinal region and elsewhere and known as *erythrasma*. It is not rare in this country. Jeanselme says it is very frequent in exotic countries, as is the *microsporum furfur*, cause of *pityriasis* or *tinea versicolor*, which forms lighter areas on dark skins, reddening when heated and sweating. In connection with *pityriasis versicolor* we may note that Jeanselme describes a parasitic affection in Indo-China and Yunnan characterised by achromic placards disseminated upon the antero-lateral parts of the neck, the face, and upper part of the trunk. This affection nearly disappears in the colder season. Unlike *tinea imbricata*, it is found far in the Continent. The epidermis over the patches is usually loosened as in *pityriasis versicolor*, and the fungus recalls the *microsporum furfur*.

Then come two groups of cutaneous parasitic maladies, viz., the *carats of equinoxial America*, and *tinea imbricata*, which also has a special geographical distribution, and may affect the nail.

The term *carat* designates a group of maladies, each caused, it is supposed, by a special pigment-

forming epidermic parasite, which are of frequent occurrence in Colombia, South America. Identical or very analogous affections are met with in Venezuela, Bolivia, Peru, Chili, Central America and Mexico. According to Jeanselme's recent work the affection commences by one or several finely scaly patches of a grey to reddish tint upon uncovered regions. As the areas enlarge, and new ones form, they tend to generalise and fuse to form large irregular festooned sheets, which become more scaly and pruritic, and gradually take on characteristic colouring of seven principal shades, due, it is said, to different varieties or species of fungus. These colours may be violet, black, red, blue, yellow, india-ink, and white. In a given case the colour of the patches may be uniform, or varied. The hairs and nails are not invaded, but the mucous membranes may be involved. The epidermis exfoliates, thickens and indurates. All the patches finally, except the red variety, end in decoloration, and the intermixture of thick, scaly, coloured and decolorised areas give an extraordinary appearance. If untreated, the malady persists indefinitely. Fungi suggesting forms of *aspergillus* and *oospora*, etc., have been cultivated, but inoculations in the rabbit have failed.

Tinea imbricata is another parasitic affection of the epidermis met with in warm, moist, equitable climates of islands and sea coasts, and according to Bonnafy is found in the area of a triangle, of which the base on the west cuts the Malacca isles, whilst the summit attains to Samoa and Tonga, but it is observed outside these limits where the climate is favourable. The pattern of the patches is very characteristic, consisting of regular concentric partial detachments of the epidermis, alternating with rings of sombre colour. The patches multiply and coalesce and lose all regularity of pattern, and sooner or later the greater part of the surface is covered. It is intensely pruritic. The hairs escape, but the nails become diseased. The skin over the diseased patches finally becomes depigmented but erythematous. The nature of the fungus, whether a trichophyton or *aspergillus*, is in dispute.

Lastly we arrive at three cutaneous parasitic maladies known respectively as *favus* or *tinea favosa*, due to a family of *achorions*, *microsporiasis* or *tinea with little spores* due to the *microsporum* family, and *trychophytosis* due to the trichophytons.

* The lecture was illustrated by lantern slides and a collection of drawings and cultures.

It is the last two groups, popularly known as ringworms, that I propose to discuss this afternoon.

These pathogenic lower fungi grow in the epidermic structures, and they can be isolated and cultivated, reproduced by inoculation in animals, and again isolated.

When parasitic in the epidermic structures they assume simple forms, *i.e.* they are filamentous, each filament being divided by a septum at longer or shorter intervals to form cells placed end to end like a bamboo or a pearl necklace, or the cells separate from one another and no longer form filaments or mycelium. Such cells are often called "spores," but, though capable of reproducing the plant, they are not true organs of fructification.

When cultivated on favourable media the filaments assume metamorphoses of a more complicated character and organs of fructification by which they are classified.

The different types of these fungi were accurately described by Gruby in 1843-4, but unfortunately his masterly work passed unheeded. Notwithstanding that observers from time to time noted differences in the fungi observed in various cases and much diversity of clinical aspect in the lesions, ringworm as a whole was ascribed to a common fungus which was supposed to vary with the special conditions of its surroundings. It is only in recent years that the brilliant researches of Sabouraud, undertaken at the instigation of Besnier, have placed the whole subject on sure ground.

We now know that there are two great families of ringworm fungi, the *Microspora* and the *Trichophyta*, and each family has its own formal and biological characters. In each family, again, culture of the fungus enables us to differentiate objectively each fixed botanical species. All the diseased hairs, for example, from the same head, and from other children in which the disease owns a similar source, give rise to a similar culture.

As with other plants, each country has its own particular ringworm flora, though we may meet occasionally with specimens introduced from other countries.

These fungi elaborate diastases or soluble ferments by whose aid surrounding substances are transformed to a condition rendering them utilisable as nutriment, for they have no chlorophyll to enable them to get carbon from the air.

The factors determining the symptomatology are

multiple. The fungus acts firstly and chiefly by dissociation of the epidermic and hair cells in which it grows, and secondly, according to W. D'Este Emery, by the formation of a toxin which induces some inflammation of the surrounding parts. We know nothing, however, of the production of any constitutional disturbance or immunity.

The accidents of inoculation account in some measure for the regional localization of ringworm but many of the fungi only flourish under special conditions which are present in certain regions of the body or in certain climates, and consequently some are transient in their growth and some are inveterate. Warmth and moisture are particularly favourable to some, others like the child's scalp hair, man's beard hair, the nails, and so on.

The degree of irritative reaction produced by the growth of the fungus varies enormously with different species. We have little evidence of a varying virulence in a particular fungus such as we see in other organisms, and so the particular grade of reaction produced, and consequently the clinical aspect, is wonderfully constant for each species. The reaction consists in a dissociation of the epithelial cells, and a simple type of inflammation evidenced by redness, or by a degree of serous exudation which finds expression in the formation of vesicles, or infiltrated patches sometimes producing phlegmon-like or tumour-like projections of the skin. Thus the effects range from the transient red rough macules of *microsporum audouini* to the larger, more lasting, patches of *trichophytosis*, which may be papulated or very finely or coarsely vesicular, to more infiltrated circumscribed or diffuse areas. Some phlegmons have been found to contain giant and epithelioid cells. These symptoms are much modified in special regions such as the palms and soles and nails, and again by the results of scratching and secondary infection. The ringworms contracted from animals are more aggressive in their spread, and in producing autoinoculation, and are apt also to set up a higher degree of reaction. Further, it has been proved that certain fungi from animals are pyogenic, and set up a pustular perifolliculitis which when agminated in a patch and set on a markedly oedematous base constitute the tumour-like formations known as kerion.

Another character is the tendency to excentric spread of lesions, to a limited extent, in most of

our ringworms, but occasionally to a great size, especially in exotic forms. Like all excentrically spreading lesions, they tend to die down in the central parts, whilst the spreading margin stands out more freshly marked, so that circinations, vesicular or dry, are apt to be produced. Sometimes a patch shows concentric rings from a recrudescence of the growth in the central parts. This is a striking feature of *tinea imbricata*.

A third feature is the strong tendency to the multiplication of patches by auto-inoculation, generally in the neighbourhood of a pre-existing patch, and thus from the spreading and coalescence of areas extensive tracts may be involved and remarkable patterns formed. Symmetry may exist, as in pityriasis versicolor of the chest and *tinea iriguium* (so-called *eczema marginatum*), by the accident of extension, or because the fungus favours certain localities.

What is the origin of these fungi? They will grow on almost anything, and it is probable that they have a saprophytic existence like the streptothrixes, and possibly are inferior forms of higher organisms. Some, as far as we know, seem to be exclusively human, and transmitted only by contagion from person to person, e.g. the *microsporum audouini*. Some are contracted from animals, and may, of course, then form centres of further distribution.

A description of the technique of study of these fungi (comprising isolation, culture, and experimental inoculation) would take up too much time to-day, and probably would not serve any useful purpose, but I shall have occasion to refer incidentally to the microscopical examination.

Most books discuss ringworm on the old-fashioned plan, which has much to commend it clinically, according to the regions affected, viz. the scalp, beard, glabrous skin, and nails. To emphasize the multiplicity of fungi I propose to consider the families and species of fungi in order.

Microsporiasis or tinea tonsurans with little spores (Gruby-Sabouraud).—The microspora are molds parasitic on man and some susceptible animals, and like the *achoria* and *trichophyta* invade the superficial cutaneous layers and hairs, but not the nails, and they only attack the adult exceptionally.

They form a smaller group than the *trichophyta*, from which they are distinguished by the external

characters of the lesions in the skin and hair, by the morphology of the parasite, and by cultural characters.

The type is the *microsporum audouini*, which is exclusively human, and highly contagious unless preventive measures are taken. It attacks children of all ages, and may last for years. It is rare before three years of age, and tends to die out with the onset of puberty. A second attack is rare.

On the scalp the affection is characterised by the rapid formation of one or more orbicular patches of one to two inches diameter, and usually a varying number of smaller secondary macules of all sizes disseminated around either near or at a distance. If the hair be clipped to a length which permits a general view, the pattern is highly characteristic, but may be seen in some other forms of ringworm of the scalp. In time the various patches may become confluent to form extensive sheets. These patches are covered with adherent white scales, and the mouths of the follicles may be erected by their accumulation. Over the larger patches almost every hair tends to become infected, and so is made fragile, and breaks off spontaneously or is fractured by traumatism, each at a height of about $\frac{1}{4}$ to $\frac{1}{2}$ of an inch above the level of the skin. On the younger macules only one or but few diseased stumps are to be detected.

If now the individual stumps be closely scrutinised in an untreated case, each one will be seen to be surrounded for some distance beyond the mouth of the follicle by a characteristic greyish coating, more conspicuous in dark hairs, which must be distinguished from any adherent epithelial sheath. If a stump be very gently extracted with its dark bulb attached, and laid against a dark background, this grey coating will be plainly seen to extend nearly to the bulb. Sabouraud has likened it to a sticky rod rolled in sand. The fragility of the diseased stumps, their dull grey or blanched colour, and their loss of elasticity when moved, contrast strikingly with the polished, strong, elastic, healthy hairs. Sometimes in extracting a hair the gelatinous-looking root-sheath is attached, but cannot be confounded with the parasitic coating.

Owing to the length of the stumps, and the fact that almost every hair over a patch is diseased, this ringworm is the only one in which a tuft of diseased stumps can be pinched out by the finger and thumb.

In the scalp the only signs of inflammatory reaction are as a rule the desquamation, which may be fresher and more pronounced on the border of the patches to produce ringed areas. Occasionally in very young children red rings are seen. It is notorious that children vary enormously in the degree of reaction to irritants, and exceptionally more pronounced inflammation is set up and even kerion. Possibly this may be due to animal species of microspora, or the coincidence of other organisms. It is also to be noted that in pityriatic heads the amount of scaling may be excessive, and the diseased stumps may be matted down and obscured by asbestos-like sheaths. Then, again, the pruritus, which is usually slight, may be excessive, and a vulnerable scalp may become eczematized.

On the glabrous skin a number of red rough macules may be occasionally seen about the face, neck, and shoulders in the early stages of infection, but they are ephemeral, and this fungus does not appear to care for the glabrous skin. Sometimes these macules are larger, and take on a ringed form now and again, as in adults exposed to contagion.

Microscopical examination shows that the fungus in parasitic life is only found in its vegetative forms, as separate cells and as filaments, which are called simple or plain because they are septated at long intervals. Chain forms are exceptional.

The fungus further as a whole assumes an invariable disposition and aspect in parasitic life. The hair itself is invaded by plain threads, which are most abundant in the intra-follicular portion, scanty and in short irregular pieces at the distal end and terminate, as in other ringworms, just above the bulb by a fringe. The cuticle is stripped off. The hair is further surrounded by a mosaic of cells or so-called spores from a little above the bulb to some distance beyond the mouth of the follicle, and beyond that the spores are disseminated sparsely. The amount of threads in the hair, as well as the density and amount of mosaic sheath outside, varies in different cases. If a hair be carefully extracted with its bulb and examined with a magnification of about 300 to 500 diameters without too strong a light whilst soaking and clearing in liquor potassæ of the Brit. Pharm. (40 per cent. solution and perhaps a momentary warming is useful for rapid results, but tends to render some threads invisible), the characteristic

picture will be apparent. The mosaic of innumerable "spores," each about two to four μ in diameter, will be seen encasing the hair. Its position around the hair is determined by careful focussing, when we come first on the mosaic, then on the hair, and lastly on the mosaic again. Besides in many cases the sheath obviously extends at the sides beyond the limit of the hair. The bulb has characteristic longitudinal columns of these little cells on its surface. At the neck the fringe of plain threads with bulbous terminations is seen in the hair. Then the mosaic gets denser and at the free end again only odd bits of mycelium and dotted cells are met with. Sometimes several commencing fractures will be seen towards the free end, reminding one of trichorrhhexis nodosa.

Sabouraud—and he is supported by Bodin—has advanced the idea that the mycelium in the hair gives off successive lateral branches which finally bear the "spores" which form the mosaic. In my opinion no evidence of this has been furnished.

It may be useful to say that any particular specimen can be preserved by washing away the potash by spirit and water and then staining by the Gram-Weigert method. As the diagnosis of ringworm is often a contentious matter, it is sometimes desirable to preserve permanent specimens, and they are very readily made. In the macules and circinations of the glabrous skin only plain mycelium is found.

The characters of the *cultures* on special media, and the fructification organs, are distinctive.

The *diagnosis* in uncomplicated untreated cases by recognition of the pathognomic characters just set forth is easy; where the scalp is caked with the scales of complicating pityriasis or encrusted by eczema or impetigo, a preliminary cleaning is sometimes necessary. The presence of the characteristic stumps will suffice to distinguish it from the desquamating areas of pityriasis or psoriasis. And this leads me to say that the absolutely essential acquisition is the ability to recognise the diseased stump, for this is the only sure means of diagnosis in the numerous cases where many classical features of the ringworm, such as scaliness and pattern, have been obscured by treatment, and especially in the terminal stages, when only some single stumps may be left dotted about the head. A very little experience enables these stumps to be recognised with absolute certainty, even when the hair is cut

short, if the child is placed in a good light and the hair be systematically turned over. The most difficult are fine, blanched, diseased, lanugo hairs in very fair haired children. Disseminated club-shaped atrophied stumps are often seen after long treatment, and are characteristic of the borders of bald alopecia areata patches. Such alopecia may be engrafted on a ringworm head, or arise in rare instances directly in connection with ringworm. The differential diagnosis from other ringworms will be apparent later.

As to *varieties of microsporiasis* the exclusively human microsporum audouinicauses over 90 per cent. of the scalp ringworms of children in London, if exception be made of the special incidence of other forms in particular institutions. It forms about 60 per cent. of ringworm of the scalp of children in Paris, but gradually disappears as we get into Germany and Italy. A microsporum which causes a common "herpes contagiosus" of colts in France, but does not grow well on man, has been isolated from the skin of a child (Sabouraud), and a man's beard (Bodin and Sabouraud), and in this country from a dry tinea circinata of the neck of a child by Bunch. Another microsporum of dog origin has been isolated from man (Mibelli and Bodin), and Bunch cultivated it from a case of kerion of the scalp, derived from a terrier. Lastly, a fungus of cat origin that Blaxall and I frequently found, and Bunch met with, is probably a microsporum. It may cause considerable inflammation, and be the cause of an extensive eruption of macular tinea circinata of the body.

Trichophytosis.—The trichophytic fungi are the cause of a series of ringworms differing in many respects from the microsporum affections. Whilst the microsporum ringworms display on the whole a marked uniformity of clinical aspect and type of hair infection and character of fungus, and further a predilection for certain portions of the skin, such as the scalp of children, the trichophyton ringworms as a whole exhibit a remarkable diversity of clinical aspect, owing chiefly to the far greater number of species composing the group and the pyogenic and irritative qualities of some. Each species has its own clinical expression, and in a given case one lesion is for the most part a repetition of the first, allowing for difference of age. But different species make a correspondingly different picture,

one from another, which we are learning to recognise, partly owing to the fact that different fungi excite different degrees of reaction, and have their sites of predilection. Thus only a few attack the nails; some do not care about the hairs, some love the glabrous skin, others only indifferently. There is a fungus, for example, which has an extraordinary predilection for the inguino-femoral regions, setting up the so-called eczema marginatum in a number of members of the same household. The degree of reaction excited by the growth of the fungi in the glabrous skin, as in hairy regions, varies widely for different species. Dry, macular, scaly inflammations of the erythematous type may be met with, tending to become ringed, and with perhaps a notable incidence of congestion about the follicles causing papulation, or an accumulation of scales around the hairs at the mouth of the follicles. Next we find the serous exudation sufficient to form vesicles of different sizes and conspicuity, and such lesions were often called herpes contagiosus or circinatus. A ringworm contracted from the cat, and described by Bielt, is a good example. In other cases the inflammation is more pronounced, and we see plaques of inflamed, thickened skin, sometimes with the follicles specially picked out. Circumscribed phlegmon may be produced simulating blind boils, and a variety of inflammatory appearances. Certain fungi, particularly of animal origin, have been proved to be pyogenic, and from these we get impetiginous and sycosiform lesions. When a number of follicles become the seat of purulent perifolliculitis and are agglomerated on a swollen cedematous base, a characteristic tumour-like formation exists with dilated exuding follicles which was described under the name "kerion."

Microscopically we find an extreme multiformity in the aspect of the fungus, and in the details of infection of the hair follicle and its contents, corresponding with each different fungus and to a certain extent with the same fungus. But there is this important character in common, that, in striking contrast with the microspora, all the mycelial filaments in the hair are septated at short intervals to form segments or cells hardly longer than broad and set end to end to form a "sporulated mycelium" or filament in chain-like formation, varying somewhat in aspect according as the segments are cubical, spherical, or ovoid in shape. Each segment is composed of protoplasm enclosed in a

cellulose envelope, and each nucleated in some fungi. It is an endomycelial spore of a vegetative character, and not a true organ of fructification. In the glabrous skin and nails plain or simple mycelium—*i.e.* septated at long intervals—are more frequently met with in conjunction with chains. Secondly, the fungi also are almost invariably on a larger scale than the microspora. Apart from these cardinal features there is an immense diversity of aspect in different fungi, brought about by regularity or irregularity in the size of the segments and threads ($4-5\mu$ to $8-9\mu$) in a given case or with different fungi, in the amount of fungus present, and in cohesive quality of the segments, which may be marked or slight.

Whence come these fungi to be parasitic on human beings? Some appear to be exclusively human, like the microsporum audouini; others come from various animals, in whom they may be more or less prevalent. But from the facts that these fungi grow on almost anything, and that the rarity of some in animals makes their continuance in this way problematical, it is probable that they can pursue a saprophytic existence.

The trichophytos have been separated by modern researches into two great groups corresponding to two types of infection of the hair. In the first group the fungus growing down in the follicle enters the hair between the cuticle cells, dies away on the outside, and grows in the hair structure exclusively. From this peculiarity the group has been denominated *endothrix trichophytosis*.

In the second group the fungus enters the hair in a similar manner and grows there, but it also continues to proliferate in the follicle outside the hair. Hence the group is named *Endo-ectothrix trichophytosis*.

According to Sabouraud there is a third group in which the fungus remains in the follicle and does not enter the hair (*pure ectothrix*).

To give an idea of the plurality of these fungi, we may mention that in one hundred cases of trichophytosis of all sites and at all ages Sabouraud in Paris, found that some 60 to 70 per cent. belonged to a common endothrix type to be immediately described, whilst the remainder were made up of one, two, three examples of, say, ten or twelve different types. He has isolated about twenty different species. My own experience in

London runs on very parallel lines. Each country has its own flora, and London's is very like that of Paris; but here we have a relatively larger proportion of microsporum, and possibly fewer animal contagions. The flora of exotic countries has been little studied, but it is certain they are in many respects very different from ours.

Endothrix trichophytosis.—In Paris, Sabouraud has found that a special trichophyton (called *crateriform* from its special culture) causes a scalp disease in children almost as frequently as the microsporum audouini, and it forms 80 per cent. of scalp trichophytos. This parasite is, I believe, also the most frequent trichophyton met with in London. But my experience at West End hospitals contrasts markedly with that at the Ringworm Schools of the Metropolitan Asylum Board recruited from Poor Law institutions. At the West End, and probably in other parts of London, trichophytos do not make 10 per cent. of scalp ringworms; but at the Metropolitan Asylum Board Ringworm Schools I admitted, on the other hand, about 40 per cent. of scalp trichophytos, and only one was an example of the endo-ectothrix type. The fact is, this endothrix type is an insidious one and a fertile source of contamination in institutions. When these cases are cleared out and cured I have no doubt the proportion will greatly diminish; indeed, the process is already far advanced.

The objective lesions and microscopical appearances of this common endothrix crateriform trichophyton are perfectly distinct from microsporum. On the scalp a typical case presents with a dissemination of pityriasis-like, scaly areas, generally numerous and perhaps not exceeding the finger-nail in size. A larger parent patch may exist in a few cases, but these often seem to be simply due to coalescence of several neighbouring areas. As a rule there are no large scaly patches which at once catch the eye. There is simply a scurfy head, with broken hairs in small patches, which may readily pass for pityriasis, and consequently the ringworm is very apt to be overlooked and spread in institutions.

If these little scaly areas be carefully scrutinised, preferably with a magnifying glass (and I always use a watchmaker's glass to keep both hands free), the hair is seen to be obviously thin over them, and their surface is dotted with dark dots interspersed amongst the remaining healthy hairs.

From this characteristic appearance the name "black dot ringworm" was applied by Aldersmith. These dark dots are often comparatively indistinct, especially in fair-haired children, and because they are covered over with scales. If the scales are gently loosened with a needle, the dark points will be found to be pigmented, swollen, very fragile, stumps coiled up like a compressed corkscrew or inturned: in fact, they are diseased stumps prevented from growing up straight by the accumulation of scales covering them about the mouth of the follicle. When the scales are removed by treatment the stumps tend to grow up straight. The degree of darkening of these stumps varies in different heads, and in some fair and red-haired children they require the closest scrutiny for detection. It is well known that more than one hair may make exit from one follicle, and when only one of these hairs is a diseased stump the latter is often difficult to distinguish in this and other forms of ringworm as well. Over these little scaly areas there may be dotted two or three to a dozen stumps, but often stumps occur in addition singly, and in twos and threes over a large part of the scalp. In other respects also these stumps can be readily distinguished from healthy hairs by their short length, their dull aspect, their generally darkened colour, their loss of elasticity, and their fragility. Sabouraud says the initial lesion is a rosy circle of rapid extension disappearing in about a week, and eventually replaced by the little pityriasis-like area, but I have never been able to observe this. It is characteristic that only a certain number of the hairs over a patch become diseased. This ringworm on the whole attacks rather older children than the microsporum, and tends to last longer, for the onset of puberty does not seem to check its growth to the same extent. Adults rarely contract it, and this fungus does not attack the beard or nails. A part of the clinical picture is the tendency to the recurrence of lenticular rosy macules about the face, neck, and other parts, spreading into orbicular lesions with a faded centre and a rosy, raised, scaly border, sometimes finely vesicular.

The *diagnosis* is easy enough when once the clinical appearances are thoroughly grasped, and in any doubt microscopical examination of a

scraping or of extracted stumps will suffice. Sabouraud rightly says—and it is true of all ringworm of the scalp—that if one cannot recognize the diseased hairs with the eye amongst the healthy hairs the microscope will not help much, because the observer does not know what to examine. In cases already treated, or nearly cured, the ability to recognise the stumps, as in microsporiasis, is absolutely essential. Pityriasis of the scalp is the disease with which this ringworm is confounded, and it is well known that ringworm-like macules of pityriasis are very commonly disseminated about the glabrous skin.

Microscopical examination after soaking of the specimen in potash solution shows the hair to be more or less packed by long sporulated threads with cubical, not readily breaking up, segments, following the direction of the hairs and branching dichotomously. The quantity varies with the stage of infection. The segments are 3–4 μ by 4–6 μ long, with a double contoured envelope and non-nucleated protoplasm. A hair in an early stage of infection may still show a few filaments outside the hair. In lesions of glabrous skin some plain threads may accompany the chains. The cuticle is often preserved on the hair to a late stage of infection.

The *culture* is of special aspect, forming a crater on a special medium with organs of fructification characteristic of the group. The fungus is not readily inoculated on animals.

Other rarer forms of endothrix trichophyton, which I need not consider at length, are met with on the scalp, beard region, glabrous skin and nails. They produce a clinical picture which we have not learnt to easily distinguish from that just given. Sabouraud mentions as the most frequent a fungus with a peculiarly resistant mycelium (*trichophyton cratériforme* β), and there are several others with, on the other hand, very fragile mycelium. One of the latter, forming a large parent patch and showing unequal spores and forming an acuminate culture (*T. acuminatum*), he originally denominated clinically "peladoid." I have not identified it with certainty in the scalp. Another *endothrix trichophyton*, furnishing a dark violet culture of a peculiar character (*T. violaceum*), is not rare in Paris, and I have isolated it in five beard cases and a number of scalp ringworms in children. Whitfield and Graham Little have also found it in London,

and C. J. White in Boston. It is the common ringworm of Italy. Some of these fungi literally pack the hair like a sack of peas, and chain formation is difficult to detect.

Lastly, I will refer to the interesting fact that Blaxall and I have isolated an endothrix trichophyton growing crateriform cultures from five cases of *kerion* of children's scalps, and also from cases of vesicular tinea circinata in the child and adult.

The common crateriform endothrix is exclusively human, but that some species may be of animal origin is proved by the case recorded by Bunch of a smooth black-dot patch due to a special endothrix fungus contracted from a cat.

Endo-ectothrix trichophytos are distinguished by the double location of the fungus in and around the hair, by their animal origin, and facility of inoculation on laboratory animals.

They cause a very small minority of scalp ringworms in children, but a large proportion of ringworms of the glabrous skin, nearly all the ringworms of adults in all sites, and most of the markedly inflammatory ringworms. They comprise many species, some of which from their rarity on man have been little studied. The degree of inflammatory reaction they provoke differs widely with different species, and may range from simple dry lesions to vesicular, moist, impetigoid patches, pustular areas with moderate infiltration, phlegmon, and the conglomerate perifolliculitis known as *kerion*. Some are pyogenic. The trichophyton gypseum of the horse, so called from its white plastery cultures, is a type of a group derived also from the cat, pig, calf, and dog, and setting up marked inflammation. Others have been traced to birds, the ass, and so on.

The *microscopical characters* of these endo-ectothrix fungi, and the details of the picture of their infection of the hair, differ widely. The amount of fungus infiltrating the hair and the amount of fungus sheath outside and around the hair vary in different cases and in different hairs of the same case. Thus the hair may contain only comparatively few threads or be packed as in endothrix, or around the hair may be only comparatively few threads or a dense aggregation ensheathing the hair may be formed as in microsporum, *but the fungus is bigger and one always finds traces of chain formation*. In some of the highly inflamed cases the diseased hairs fall out and it is sometimes very difficult to procure a specimen.

Ringworms giving faviform cultures.—A certain number of fungi have been isolated here and elsewhere which seem to be of a special character, growing peculiar cultures termed "faviform" with a peculiar mycology, and forming in some measure a connecting link between the ringworms and favus. Bunch obtained one from a dry tinea circinata of a girl's arm, and Blaxall and I isolated them from an impetigo-like lesion, from a circinate patch on a child's elbow, and from a dog. Bodin has isolated similar growths from suppurating lesions in man contracted from an ass, from suppurating lesions in man contracted from a horse, and from a calf.

Regional survey.—It thus appears that a great number of species of all kinds may attack the scalp, especially in the child. The microsporum audouini infection forms the great majority of cases in London, and makes a characteristic picture almost invariably. Then come the endothrix trichophytos, especially the one growing a crateriform culture, then the one with violet culture and these form the characteristic pityriasis black-dot patches. In the third place come the rarer endo-ectothrix trichophytos of animal origin, often due to very rare species, and the multiplicity of species is associated with a corresponding clinical diversity ranging from dry inflammatory areas, through vesicular patches, to phlegmons and *kerion*.

Beard lesions are due chiefly to endo-ectothrix trichophytos derived from the horse, calf, etc., and are generally characterised by marked inflammatory lesions. Next in order come the endothrix trichophytos giving the acuminate culture and the violet culture. The latter is the one I have met with in a large proportion. Bodin has also isolated a fungus growing a crateriform culture, and Sabouraud one with peach-coloured culture, derived from the pullet. The barber I believe to be a frequent instrument in propagating beard ringworms.

The *glabrous skin* may be affected on occasion by nearly all these fungi. I have already mentioned the frequent occurrence of multiple lesions in certain stages of the common ringworms of the scalp. The so-called eczema marginatum or tinea inguinalis may be due to several species of fungus which may attack person after person in a house. In hot countries, where ringworms are very frequent, the body becomes covered with lesions generally spreading from the groin region at certain times of the year. These exotic ringworms are frequently vesicular and may become eczematized by the scratching for the relief of the intense irritation set up. It is worth mentioning also that chronic ringworm of the thick skin of the palms and soles may be very difficult to diagnose.

Lastly the *nails* are only affected, and that rarely, in Western Europe by certain rare endo-ectothrixes and the trichophyton acuminatum and violaceum.

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A CLINICAL LECTURE

ON

ADENOIDS AND AFFECTIONS OF THE TONSILS.

Delivered at St. George's Hospital,

By A. MARMADUKE SHEILD, M.B., F.R.C.S.,
Surgeon to the Hospital; Surgeon in Charge of Throat Department.

GENTLEMEN,—This afternoon I am going to speak to you about the very common ailments known as enlargement of the tonsils and adenoids. These diseases are not only very prevalent but they are of great importance, for in everybody's practice numbers present themselves. Indeed, you will perhaps not be in practice a week before you will be consulted about one of these cases. Therefore you will see it is of the greatest importance that a medical man should know all about them. First of all, recollect that as regards adenoids and enlarged tonsils there is really little or nothing different in the causation and pathology of the two affections. Consequently they are often associated. I mean to say that in a patient in whom there is enlargement of the tonsils you will frequently find that there are adenoid growths as well. The lymphoid tissue, the enlargement or hypertrophy of which forms both adenoid growths and tonsillar enlargements, is found in a variety of situations in the throat. First of all there is the well-known pharyngeal tonsil which is situated behind the soft palate in the median line on the back of the palate. Enlargement of that tonsil forms one of the varieties of adenoids. Then there are the faucial tonsils, which are located between the pillars of the fauces on either side. For all practical purposes you can look on these as lymphatic glands, soft, easily inflamed, easily infected. There are enlargements also of secondary importance. I refer to the lingual and laryngeal tonsils. The lingual

tonsil is a mass of hypertrophied tissue situated between the base of the tongue and the epiglottis. The laryngeal tonsil is a mass of adenoid tissue found in the anterior commissure of the larynx. Both of these masses are of secondary clinical importance compared with the enlargement of the pharyngeal and faucial tonsils, and they seldom really cause bad symptoms.

We will pass on without saying anything more from an anatomical point of view, to consider the etiology or causation of these diseases. One of the first "predisposing causes" in the production of enlargement of the tonsils and the formation of adenoid growths is what is termed, perhaps for want of a better name, the lymphatic temperament. You know, of course, that kind of condition of body which predisposes to the formation of glandular enlargements from slight causes. Therefore the sufferers from these diseases are generally young children or young adults, who are of delicate constitution with fair skins, and in consequence they are particularly likely to suffer from enlargement of lymphatic structures on the very slightest provocation. They are very prone to be infected by the tubercle bacillus. Damp, cold, and especially exposure to dust, are most potent causes in the formation of enlargement of tonsils and in the production of adenoids. And it is interesting to note that you could not have a more typically unfavourable climate for the production of these diseases than is to be found in large cities, in the neighbourhood of rivers, with cold, fog, dust, and absence of sunlight. The "children of the slums" generally suffer from these diseases. And the open mouth and vacuous stare of the London degenerate is sadly familiar to us in the hospitals. The anæmia from which these children so commonly suffer, in consequence of bad light and air and improper and insufficient food, is often associated with enlarged tonsils and adenoids. Many a child with enlarged tonsils and adenoids suffers also from congestion of the pharynx and chronic constipation; from worms or indigestion of various kinds. An adult with engorged throat may have hepatic congestion and chronic constipation. I want to point out to you that the condition of the intestinal canal is very important from the point of view of treatment of these diseases of the throat. For instance, you will find an adult who is constantly

getting attacks of sore throat, pharyngitis and other throat troubles of a chronic congestive nature, will be much benefited by directing attention to the alimentary canal. And so you will find that a child who is constantly getting colds and engorgement of the lymphoid tissue in the throat may be sometimes completely cured by a fortnight or three weeks' residence at the seaside with treatment directed to the alimentary tract without any operative interference at all. Thus the treatment of adenoids, enlarged tonsils, and allied conditions is not altogether operative, but therapeutical measures have to be taken into consideration as well.

Adenoid growths fall, as regards structure, into two classes. First, the soft, spongy, friable adenoids, and secondly, the tough and fibrous. The soft, friable, spongy growths are found in young children, and the more tough variety in young adults, in whom the disease has been allowed to go on unchecked and untreated for some years. The symptoms of these disorders and enlargements of lymphoid tissue at the back of the nose—the so-called pharyngeal tonsil—are, as you know, very marked. First of all, in a typical case there is the expression of the patient, the well-known open mouth, the high arched palate, the lateral compression of the bones of the face, the projecting front teeth, and the loud snoring at night. There is also mental stupidity and deafness. A certain percentage of these patients are chronically deaf. They can scarcely hear anything of ordinary conversation, and they have all their lives missed the unconscious education of hearing the views and talk of others. In consequence of this, no doubt, they become provokingly stupid, heavy and dull. The chest of these children is often ill formed, on account of air imperfectly entering the thorax. Then the child suffers from night-terrors, and starts up with violent symptoms of choking, almost as if he were going to suffocate. In fact, the mothers of the children who are brought to the throat department summarise the symptoms by saying that "the children breathe loud through their mouth," and at night "they choke as if they were going to die."

Another very common symptom which these patients suffer from is a dribbling of mucus from the nostrils, causing a condition of chronic eczema. The child being unable to properly blow or clear its nose, the mucus escapes anteriorly, and there is

an eczematous eruption over the lip. Again, the well-known voice of nasal obstruction is typical in these children. They "bite" or "clip" their words, especially pronouncing consonants badly. For instance, if you get a child with adenoids to read a passage out of a book, or to recite, you will notice that he "clips his words," and speaks in such a mumbling way that you can scarcely understand him. At school, as I have told you, these unhappy boys have an uncommonly bad time of it. They are too stupid to learn their lessons properly, and they cannot hear properly what is taught them, and in the old days they used to spend their time in doing impositions and getting their ears boxed by brutal masters. These unhappy boys failed in the race of life and ended their days in sheep farms in the Colonies, or poultry farms in this country, or other pursuits where deafness was not a serious drawback. You must also remember that a certain amount of adenoid growth may exist in quite a roomy naso-pharynx. Very much depends on the size of the nose or naso-pharynx as to whether these patients suffer much from obstructive symptoms or not. A boy with a roomy naso-pharynx may have bad adenoids without exhibiting the pronounced symptoms which you find in a boy who has adenoids combined with a narrow nose. In the latter case the symptoms will be very much aggravated, but they will be of the kind which I have described to you.

We now come to the question of the diagnosis of adenoid growths, and I want to dwell with care upon a matter which will be one of no little difficulty to you hereafter. In a young adult, especially a sensible, tolerant adult, a boy or a girl of fifteen or sixteen, with a roomy palate, you can generally see the adenoids very clearly with the rhinoscope, which I now show you. The way it is used is as follows: Treat the palate with a spray of 5 per cent. cocaine, and then heat the little mirror over a lamp. Employ a strong reflected light. Place the mirror behind the palate, and by gently shifting it you will probably see the adenoid masses. Also, in order to complete the diagnosis, it is customary, and perhaps it is as well, under cocaine, to pass the finger to the back of the nose. Previously wrap the root of the finger in some lint, and then pass the digit rapidly behind the soft palate. You will then feel masses of adenoids distinctly, granular, spongy, friable

material which is unmistakable and easy to identify. There is one little caution I want to give you here. You must be cautious that you do not mistake a polypoid growth in the naso-pharynx of a young adult for adenoids. But I can tell you for your encouragement that polypoid growths in the naso-pharynx are very rare; you may see hundreds of throat cases, as we do here, without seeing more than one or two instances of polypoid growths in the naso-pharynx. The feel of a polypus is absolutely different from that of adenoids. It is smooth and round, and as a rule is very readily identified with the rhinoscope. Those who are taking notes may make a special one in regard to this little point, not to mistake a myxomatous or fibromyxomatous polypus for adenoid growths, otherwise you will find that you have become landed in an operation of no small difficulty, and if you are not exceedingly careful you will "make a mess" of the case. The diagnosis of adenoids in tolerant young adults treated with cocaine is not a difficult matter; they will generally let you put your finger behind the palate, and you can sweep it round the naso-pharynx and feel the adenoids plainly. But the case is far otherwise with intolerant nervous persons and young children. The question whether young children have or have not adenoids is often a very difficult one to decide. If you are treating a young child of say four or five years of age, you can open its mouth forcibly with a gag and wrap up your finger and pass it behind the palate. You will then be able to feel the growths easily. But the child will cry, struggle and bite. The whole proceeding will appear to the friends rather brutal, and you may find that the mother will not trouble you again for your attendance. How, therefore, are you going to settle the diagnosis in these very awkward cases? I will illustrate to you an instance which occurred to me only last week. A little girl of six years of age, who had been spoilt in bringing up and was very wayward, was supposed to have adenoid growths. She was deaf, snored at night, kept her mouth open, had perpetual colds and many of the symptoms associated with adenoids. But a difference of opinion existed among the doctors who had seen the case as to whether she had adenoid growths or not. Attempts had been made to examine, and they were of necessity incomplete. The moment I tried to approach the child

it resisted and cried violently, and I knew that I should not be able to make a proper examination. Moreover there was a risk of offending the parents by apparent roughness. Therefore I did what I advise you all to do in such cases. I placed the child under an anæsthetic, so that the examination could be properly conducted. Thus, as "differences of opinion" had existed, a diagnosis could be made free from any doubt. I took care to associate with me the doctor who had recommended the case, so that he might also feel the adenoids under the anæsthetic, and that there should be no question of insinuation of operation which was not needful. This I think is the best way of managing a class of case which will have surprised you to hear me call difficult. Mistakes, and worse, are every now and then happening through medical men attempting to pronounce a diagnosis in these cases without the aid of an anæsthetic. If the growths are present they can be operated upon at the time, the instruments having been prepared beforehand for the purpose. You will be saved from many an unpleasant experience if you carry out this plan of treatment.

Supposing adenoid growths are detected, the first question which arises is as to their treatment. You will not forget what I told you about the great efficacy of the general treatment and careful attention to hygiene and exposure to good air, especially sea air. But where the adenoids are sufficient to cause symptoms, especially ear symptoms, I think it wiser to remove them. And it is a very useful operation if done properly. Everyone thinks he can perform the operation for adenoids. I regret to say that a large number of them are done imperfectly, for the reason that some think that what is called a "whiff of chloroform" or a "whiff of gas" or some such transient anæsthesia is enough for the removal of adenoid growths. While this very imperfect insensibility lasts a few frantic scrapes are made in the naso-pharynx. Free bleeding attending the procedure, there is an idea that the operation has been very thoroughly performed. But I assure you that the operation for removal of adenoids, especially in private practice, should never be done in a hurry. The patient should be thoroughly anæsthetized, so that the operation may be done methodically and slowly, so that all the lymphoid tissue may be removed from the back of the pharynx, and especially from the

neighbourhood of the Eustachian tubes.* The question of the anæsthetic is indeed a very important one. It is the "crux" of these cases. Nearly all the sad disasters which have occurred in this operation have been due to the anæsthetic. If the patient is in an improper position and is deeply anæsthetized by chloroform, and if in this condition he inhales a lot of blood and soft growth and it gets into the air passages there will be a disaster. Very terrible are such accidents, particularly in private practice. I am thankful to say I have hitherto had no fatal case myself, because I have been associated in my practice with the anæsthetists of this hospital, where I am glad to say particular care is exercised in all matters relating to this most important branch of practical medical education. You will ask, What is the proper anæsthetic? My own practice for these cases is to discourage the administration of chloroform to start with. I believe the safest method is to put the patient fully under gas and ether with a prop in the mouth. Very often these cases have imperfect nasal breathing, and therefore the prop should be a large one. After anæsthesia has been produced by gas and ether, chloroform should be administered for the remainder of the operation. I do not know of any bad results following this method. The after administration of chloroform lessens the congestion and vascularity induced by ether alone. I do not wish to act as an alarmist. I merely wish to caution you to take great care in the matter of anæsthetics in throat operations attended with hæmorrhage, and then you will sail along smoothly enough. I hope you will remember this in after years. If you have a bad case of tonsils and adenoids to operate upon, and you cannot obtain the services of a good anæsthetist, you had far better leave it alone, especially if the patient is a member of an important and exacting family. You may, after the fashion of politicians, muddle through the case "somehow," but it is also possible that you may have a disaster; and remember that a chloroform death in a country town, especially with a "new doctor," is not a good introduction to practice. Nothing will more surely shatter your reputation. With regard to the posture of the patient for the operation of removal of adenoids, this is difficult for me to advise upon, and I hardly like to be dogmatic, because every

* I am aware that this method is not generally in vogue.

man has his own plan of operating. One will say all cases should be done with the head hanging far back over the end of the table. Another will operate upon all his cases with the patient sitting up in the arm-chair; another will operate with the patient laid horizontally. I operate on adenoids with the patient lying upon his side. I have always advocated that position as one of great safety for operations associated with flow of blood into the naso-pharynx and air passages. I do not choose that position because it is the most comfortable for the operator; I select it simply because it is one which offers additional safety to the patient. If you perform the operation with the patient sitting up in an arm-chair, everything will depend upon the skill and celerity with which the anæsthetist can sponge the naso-pharynx. And there is something I particularly want to say about sponges. You must take care that the sponges you use for this purpose are coarse ones. By no means have fine ones, but let them be of decidedly coarse texture. And take care that they are well scalded and purified in antiseptic fluids before you attempt to use them in the throat. If I operate in the sitting position I am provided with six such sponges almost as large as a man's fist, of coarse texture. Small sponges are dangerous if they slip away from the operator. Another very important point, or so I regard it, is to never use sponge holders. As if the perils are not sufficient in this profession already, bad instruments make more for you. You will see an assistant make a dive with a sponge as big as a walnut on a sponge holder, and then bring away the holder minus the sponge. This is perhaps left somewhere in the upper air passages. The right way to sponge away the blood in a throat case is by means of a large sponge of coarse texture held either in the hand of the surgeon or a clamp forceps. If you do this you cannot go wrong. You can deliberately sweep the blood out of the pharynx, and the sponge is too large to enter the larynx. I have said the position I always adopt in these operations is with the patient lying on his side. You can then operate slowly, and whatever instrument you employ you can use deliberately, and whatever blood comes away runs into the hollow of the cheek in the dependent part of the mouth and not down the throat. In this position sponges need seldom be used at all. I have now been operating upon these cases for

many years, and I have never had the least bother or worry from portions of growth or blood getting into the air passages. There are no particular dangers about the operation for adenoids besides the anæsthetic which I have mentioned. Of course there is the risk of continuous hæmorrhage, as in all throat operations, in those who are the subjects of the hæmorrhagic diathesis. You should always be on the lookout for this condition, especially in private practice. You will find, in the aristocratic families, that the subject of hæmophilia is a very white-faced delicate boy, with peculiarly fine skin. The affection is commonly hereditary. But do not think that this condition is at all common; it is very rare. There is another complication which sometimes follows operations for the removal of adenoids, though very rarely, and that is inflammation and suppuration of the middle ear. That is almost always due to sepsis, and generally, I think, the sepsis is due to failure to keep the parts clean after the operation. A large number of operators of great experience never adopt any form of after-treatment for adenoids. I do not know why this should be. I think I stand largely alone in the matter of after-treatment, but I always adopt very careful measures in private practice. I have the nose sprayed with a weak spray, for instance, a 10-volume solution of peroxide of hydrogen, and I make the patient inhale the vapour of carbolic acid in creasote thrice daily. Should there be much clotting of blood I have made it a practice to syringe the nares through with warm boracic acid lotion. The tube attached to the syringe should never block the nostril, but only pass easily within it. There is a possible danger in operations for adenoids which it is right I should tell you of, and that is the presence of an abnormal vessel in the naso-pharynx. You know the positions of vessels about the pharynx and no doubt could repeat their names, but it does occasionally happen that a large vessel will branch off and run across the back of the pharynx. I presume it is an enlarged ascending pharyngeal artery. I have recognised these vessels and seen them pulsating at the back of the throat. They must carefully be avoided. But I believe that the hæmorrhages which have usually occurred in adenoid cases have been from the too free use of forceps. All the varieties of forceps are very good instruments for tough adenoids if they are used with caution, but you must recollect if you seize a mass

behind the nose with them and "wrench" it forcibly away, you may tear out great strips of mucous membrane. Personally I have seen the pharyngeal orifice of the Eustachian tube thus dragged away. And once I saw extensive pieces of mucous membrane shown by the operator to the parents of a child as proof of his great skill and celerity. If forceps are used, the adenoids should be crushed and "nibbled" off with them. Violent tearing movements should be avoided. The instrument should be guided by the left forefinger. I do not tell you about hæmorrhage after adenoids to alarm you. The accident is excessively rare, and you may operate upon these cases all your lives without meeting such a disaster. The forceps is an instrument I seldom use. But in tough adenoids in young adults it is sometimes essential.

Before I pass on to talk of the instruments used for adenoids, I must give you one further caution, a caution which is especially important in private practice. There is no person more likely to be infected with the poison of scarlet fever or diphtheria than a child with a raw place at the back of the nose. This is a fact which you would perhaps scarcely think of. You may go from a case of scarlet fever to see a case of adenoids which has been operated upon; if you do so you are very likely to cause the patient a dangerous illness. So if you are going to do a throat operation for the removal of adenoids or enlarged tonsils, do not operate if there is scarlet fever or diphtheria in the neighbourhood, especially if you have a case of one of those diseases which you are personally attending. One of the worst anxieties I ever had when I began practice was of this nature—the removal of adenoids and enlarged tonsils in a little girl. The doctor who attended this child went straight from a scarlet fever case to see the patient, and the child got a scarlatinal infection at the back of her throat which very nearly proved fatal. All such sanitary considerations, as well as the actual drainage of the house, should have due attention paid to them; trivial as such matters may seem, they are very essential.

With regard to the operation itself, it can be done with a variety of instruments. I have already explained to you the employment of forceps, and how they should be used. The most useful instruments for this operation are Gottstein's currettes, of which a selection is on the table for

your inspection. Here are the currettes for cutting off a mass in the posterior part of the naso-pharynx, and here is a curette for use laterally. With such a series of currettes you can do any case of adenoids which you are likely to meet with. Here is an instrument which is called a steel nail. I think this is very little used in London now, but I am one of those who still employ it. Very strong "sweeps" can be made in the naso-pharynx with it, and it is very useful for fairly soft growths. There is one precaution with regard to its use, and that is to tie it to silk which is wound round the finger. If you do not do this the nail may fall off and be swallowed, or pass into the air passages. The mouth should always be thoroughly well opened with a good gag, and with pieces of tubing put over the ends of the arms of the instrument. Doyen's gag is an invaluable instrument for these cases, and I frequently employ it. The gag and all the instruments should be boiled and sterilized after each case. You will perhaps scarcely credit it, but I once saw an awkward accident from the piece of tubing slipping off the gag. It was loosely placed on, and this trivial carelessness gave rise to alarm, for the substance nearly passed down the larynx. Next, with regard to the use of the gag, you must be careful that you do not loosen and remove a patient's teeth with it. I was asked the other day at a dinner party by a lady, why it was that laughing gas caused the teeth to drop out? I asked her why she put that question to me, and she said one of her children had been operated upon for adenoid growths under gas, and after the operation two of its teeth were found missing! Children's teeth are often loose, and you must be cautious about knocking them out by the use of the gag.

I think I have told you all that is necessary for you to know about the operation for adenoids. Remember you can do it with perfect ease if you are careful about the anæsthetic and all the minutiae which I have mentioned. But you cannot be too careful to remember that when you undertake operations for what is called minor surgery, they are hung round by attending perils, and unless you exercise care in every particular you will, some day or another, bring about disaster. For instance, I do not suppose one medical man in a hundred would care whether

there was an epidemic of scarlet fever or diphtheria in the neighbourhood when operating for adenoids. But one day he will yet get "caught" in this complication and there will be a bad disaster. As a sequel to operation methodical breathing exercises are essential.

We will now pass on to consider the well-known faucial tonsillar affections. I shall not have time to finish this subject to-day, because those maladies are of such importance in practice. The faucial tonsil is nothing more than a large lymphatic gland. It is just as much a lymphatic structure as a gland in the groin or neck. It is a very soft and vascular lymphatic gland. It is frequently ulcerated on the surface from inflammatory causes, and it is exposed to a variety of sources of infection. Therefore it is not surprising that the faucial tonsil often becomes inflamed and that an abscess forms in it; that it becomes chronically enlarged and is the seat of tuberculous or diphtheritic affections. It is difficult for me, sitting here, to enumerate to you all the possible causes which may produce acute inflammation of the tonsils. I should divide the causes of inflammation of the tonsils into those which affect the tonsil from without, and secondly those which affect it from within. Those which affect it from without are all the various infections which may gain access to the throat in respiration. First of all comes the familiar "hospital" or "drain" sore-throat. This is generally due to the direct infection of the tonsil by organisms which, through some ulcerated surface, gain access to the gland. Another frequent cause of infection from without is diphtheria or scarlet fever. The specific organisms of these diseases graft themselves on to the tonsil. Another cause commonly present, but often overlooked, is alveolar suppuration and bad teeth. People with bad teeth may suffer from very dangerous suppurative tonsillitis. So you see how important it is when a child or young adult has enlarged and ulcerated tonsils that these should be removed. They are a constant source of danger from risks of various infections. And it is too probable that tuberculous disease of the glands of the neck frequently have their starting point from unhealthy tonsils. By tonsillitis from within I mean those morbid products circulating in the blood which may produce lymphatic gland inflammations, and they are very

numerous. First and foremost comes that vague and uncertain condition which produces gout and rheumatism, the so-called uric acid or rheumatic diathesis. People who are born of gouty parents are especially prone to suffer from repeated attacks of tonsillitis, and rheumatic people will suffer from acute tonsillitis more than others. If you are asked the causes of acute tonsillitis from within, you will have to enumerate all the causes of rheumatism, such as exposure to cold and damp, and the conditions which produce rheumatic inflammations of the joints. I think tonsillitis is very common in those who suffer from gastro-intestinal disorders. This, I am sure, is the explanation of the recurring tonsillitis frequently met with in young people, especially young girls who suffer from marked constipation, a foul tongue, congested and sluggish liver. These mysterious attacks of recurring tonsillitis in such people are often cured by free purgation and exposure to pure air. The old-fashioned black draught and blue pill is a very important prophylactic against repeated attacks of tonsillitis. I need hardly mention to you the symptoms of acute tonsillitis, which are so very well known. The slight soreness becoming rapidly worse, the agonising tender swelling which fills up the throat, the dull-red appearance, the high fever, the enlargement and tenderness of the glands behind the jaw, the foul tongue, the exquisite agony in swallowing and impediment to breathing, are the phenomena found in that familiar and common affection known as an attack of quinsy. Indeed, some of you may have suffered from it in your own persons. It is a very common affection in practice. You may be called upon to treat half a dozen cases of "quinsy" in a week. One of the first considerations about the case is the diagnosis. Acute tonsillitis which comes on in this way is usually tonsillitis and nothing else. Of course, the great fear and difficulty is the diagnosis from true diphtheria, and I pity you when a number of "sore throats" occur in a school, and you are called upon to interview the master and say whether the epidemic is diphtheria or not, and whether it is dangerous to other boys. You will be sure to be asked this question. The diagnosis between tonsillitis and diphtheria may be so difficult that, personally, I would never be too positive, unless in very marked types. I have known mistakes committed by the very best men

between acute tonsillitis and diphtheria. In communities of young people—and young people are very vulnerable—err on the safe side and isolate the patient. I need hardly say that the secretion from the surface of the tonsil must be examined by a highly competent bacteriologist. Do not be too eager to pronounce a diagnosis yourself. It is said that the detection of the bacillus of Loeffler clinches the diagnosis of diphtheria. I have known cases where the best bacteriologists have failed to find the bacillus of Loeffler, and yet in which the ordinary phenomena of diphtheritic paralysis followed, the case having been diagnosed as one of ordinary acute tonsillitis. Always isolate a suspicious case, and if there is grave doubt in the diagnosis say so openly. Never guess or pronounce rashly. In my experience it is the slighter cases of tonsillitis which are so apt to be confounded with diphtheria, and among young adults and children in schools your caution in such cases must be extreme.

With regard to the treatment of so-called quinsy, recollect what I told you, as to how you should always begin with the giving a dose of calomel and a saline draught. This used to be the routine treatment in the early stage of an attack of tonsillitis, and it is by no means a bad one. And before I leave this part of the subject I want to make a remark about purgatives. You must remember that the bowels of the delicate private patient are not like the intestinal canal of a navvy or dustman! I have seen gentlemen in practice give a refined delicate girl with an attack of tonsillitis five grains of calomel, a dose which we are accustomed to give in the Oxford Ward to navvies and coachmen. One and a half to two grains of calomel will be found to be quite sufficient to purge the kind of patient I am talking about. Having given a purge to open the bowels freely, then comes the question of the application of cold or heat. Now, the practice in this respect is very divergent. You will take up one book on the subject, and the author will say put on hot compresses and use hot steam. The next book you consult will say it is a great mistake to apply heat to these cases, and that it fosters suppuration; you should always use cold. The rule I go upon myself is this: that cold is useful in tonsillitis at the outset if you get the case early, before there is very much swelling. At such a stage I have found an ice compress

applied round the throat and sucking a small quantity of ice, of very great benefit. If the disease has thoroughly established itself I apply hot steam applications. Now comes the question of local applications to the throat. I have looked up references to this topic in some newer works, and I have found that they recommend gargles in tonsillitis. This to me is very extraordinary. If you order your patient to use gargles in tonsillitis, you will say to him afterwards, "Well, did you use the gargles?" He will reply: "No, how could I?" The fact is, the throat is so agonisingly tender that these patients cannot gargle. Therefore any applications to the throat should be applied in the form of a spray. Or a soft brush may be employed, or cotton wool on a long forceps. There are all sorts of preparations which may be used for cleansing the tonsils. One of the best is peroxide of hydrogen in a 10 to 15 per cent. solution made up with hydrate of chloral twenty grains, and cinnamon-water fifteen to twenty ounces. You will find this very pleasant for the throat, and you can mop the deposits of foul secretion which hang about the inflamed tonsil. With regard to specific drugs in acute tonsillitis or quinsy, one of the first questions is the consideration of giving aconite. If you do administer this drug you must watch the results very carefully. Do not be incautious enough to send a bottle of it to a family in the country five miles away from your house, or there may be a disaster. It is certainly a valuable drug given at the onset of acute quinsy. Give two minims of the tincture of aconite every hour for four hours. You will find that even this small quantity will lessen the inflammatory symptoms in a marked degree. Other drugs which are vaunted as efficacious in this affection are salol, guaiacum, and tincture of perchloride of iron. The latter I have never much employed in acute tonsillitis; it tends to constipate the bowels, and you will have gleaned how important a factor in the treatment is free action of the bowels. But salicylates are valuable, especially where you learn from the history that the patient may have suffered from rheumatic affections. One of the best preparations is salol given up to forty grains a day in ten-grain doses. Salol is insoluble, and I mention this because I have known young medical men prescribe it in two ways. First they will give it in mere watery solution, when it appears as an insoluble powder. Or it is given with mucilage, and so much mucilage is prescribed that the patient writes to say he cannot pour the medicine out of the bottle! It is no part of my surgical duties to teach you how to prescribe. But I warn you very seriously not to neglect the use and know-

ledge of drugs. This is made light of, in the present lamentably unpractical method of medical education, and in the future a want of the principal knowledge which should equip a good practitioner will come upon you as a disagreeable surprise. Another valuable drug is guaiacum, and that is best given in five or eight-grain doses three or four times a day in black currant lozenges. If you find in spite of the salol and guaiacum and all your other treatment that the disease gets worse and the patient is in great agony, recollect that scarification of the tonsil should be performed. You take a curved bistoury, put strapping round it, and allow one-eighth of an inch of the point to project beyond the strapping, and with a good light simply prick the tonsil all over in the congested parts, and encourage bleeding by effusions of warm water which the patient puts into the back of his throat. The relief is often extraordinary. Should the swelling subside, you can then finish up the case by the administration of tonics, such as quinine. And a change to good sea air is very useful after. And then remember the question of removing the enlarged tonsil must arise. In most of these cases the tonsil remains enlarged, often "ragged" and ulcerated on the surface. Another attack of the disease is almost invited. You have to remove the tonsil to avoid this future trouble.

That brings us on to the subject of suppuration in tonsillitis and to the question of the treatment of abscess of the tonsil. It is a common enough termination, and I must deal with it in a future lecture.

Before we part to-day there is a special caution I want to give you in the treatment of quinsy likely to suppurate. It is that you should never give the patient morphia if you can help it. These patients almost invariably suffer from so much local wretchedness that, especially if they are medical, they will implore you to give them hypodermic injections of morphia. Now one of the few risks of tonsillitis is that an abscess may form, burst, and the contents escape down the throat and air passages. If you have a case of tonsillar abscess and you put the patient heavily to sleep with morphia, he will lie in bed with his throat almost blocked by mucus and swelling. The abscess may burst while he is thus comatose and the contents run down into his air passages, and he will die of suffocation. It is far better to leave a patient sleepless than to place him deeply under morphia. If he is awake when the abscess bursts he can cough the pus up. I knew of a disastrous case which occurred at a public school in which a boy with a large tonsillar abscess had a subcutaneous injection of morphia, and he died in the night of suffocation. We must continue this subject in a future lecture, when I shall hope to speak further of tonsillar abscess and its treatment.

A CLINICAL LECTURE ON SOME COMMON AFFECTIONS OF THE FACE.

Delivered at St. Bartholomew's Hospital.

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GENTLEMEN,—I have only time to consider a few out of the numerous common affections of the face; these shall be—first, the very common affection called acne; secondly, the less common but more severe disease lupus; and in addition some other diseases which from their names you might think to be mere varieties of acne and of lupus, but which really differ from them.

Let us begin by considering true acne, called also "acne vulgaris" and "acne adolescentium." We know fairly well what the morbid anatomy of such an acne is: it is a disease of the sebaceous glands. The sebaceous glands, I need hardly remind you, are appendages of the hair-follicles; these glands are deeply seated in the cutis vera, their mouths open into the hair-follicles not far from the surface of the skin. In those parts of the face which acne most affects, though the hair-follicles are ill developed, the sebaceous glands are particularly large. An acne spot arises thus: first the mouth of the gland becomes filled with a wedge-shaped plug of epithelial debris, which is sometimes called a "comedo," and sometimes by the more familiar and more expressive term "blackhead," because the plug shows black on the surface of the skin; next, the gland becomes distended with retained secretion; then inflammation sets in, either in the gland or around it. Generally this inflammation is chronic, causing the tissues to become infiltrated and thickened, but sometimes a definite abscess forms. These steps can be traced clinically. Blackheads are nearly always to be seen and often little reddened papules which mark the situation of the distended and inflamed glands. Sometimes these are capped with a point of superficial suppuration. The deep-seated periglandular inflammation shows as ill-defined, dark red blotches, which to touch may be firm and nodular. These may soften in the

centre, or after persisting for a time as disfiguring patches they may eventually disappear. But permanent scars may be left, for the deeper layer of the skin, the cutis vera, has been involved. Luckily the individual scars are not large, for the inflammation does not spread far beyond the neighbourhood of the affected glands. What causes the development of the comedones, or blackheads, with which, as we have seen, the disease begins? Some pathologists consider that they are due to a special bacillus, quantities of which are found in them. The secondary inflammation and suppuration is probably caused by other micro-organisms; but some authorities hold this micro-bacillus of acne to be responsible for the whole series of events. But even supposing a bacillus to be the exciting cause, there are other conditions necessary for the development of acne. One is the age of the patient. It is a remarkable fact that the disease develops in young people—that is to say, from the time of puberty to that of completed development; hence the name “acne adolescentium.” It is equally common in both sexes; so that sexual differences as to the development of hair do not appear to influence this disease of the sebaceous glands. Again, it is generally found in people with a peculiar character of skin—that is to say, a somewhat thick skin, dark, and coarse in texture, and containing large sebaceous follicles, which you can often see at the sides of the nose. This you may observe in two of the patients I shall show you. And generally also they have dark hair. Exceptions are found, however; here is one, a young man whose hair and complexion are fair, and skin not coarse, but who has a plentiful crop of blackheads. He also has a great development of acne, and, what is unusual, he has it on the limbs as well as the face. Circumstances of general health may have something to do with the appearance of acne; at least, people will often tell you that it began or got worse after they had had some illness. This disease is troublesome to treat effectually; but still, you will often have to treat it, for it is very common, and that at a period of life when people consider their personal appearance. True, it may eventually get well, but probably at the cost of much disfigurement, and at a time when the patient has ceased to concern himself about it.

Local treatment is the most important. You must try to get rid of the blackheads. For this the face should be thoroughly washed with soap and water every night, steamed over a basin of hot water, and the blackheads pressed out either with the fingers, which is a rather clumsy method, or by means of some little instrument, the simplest of which is the ordinary watch key. Instruments are made for the purpose which are, perhaps, better. After this process a sulphur lotion should be dabbed on and allowed to dry on. A good prescription is the sulphur lotion of our hospital pharmacopœia, viz. half a drachm of precipitated sulphur, half a drachm of spirits of camphor, and lime-water to an ounce. Sometimes acne is complicated by eczema. In that case you must cure the eczema before you can use the soap and sulphur treatment; and in any case of acne care must be taken that the treatment, necessarily somewhat rough, does not produce undue irritation. Other drugs than sulphur can be used, such as lotions of perchloride of mercury, about a grain to the ounce; or resorcin, either as a lotion or a paste; or ichthyol. An ichthyol soap is often recommended.

With regard to the indurated spots of severe acne, the best way to treat them, if they have not actually advanced to suppuration, is to touch their surface repeatedly with pure carbolic acid on the end of a glass brush or on the end of a match, using only just enough to produce a superficial white film on the surface, as recommended by Dr. Walter Smith, of Dublin. If the inflammatory patch contains pus you must open it with a small knife and wash it out with carbolic lotion. But in addition to any local treatment you must carefully attend to the patient's general health, and especially to his digestion and the state of his bowels; and also, in the case of a woman, to menstruation. Whether drugs given by the mouth influence the rash directly is a little doubtful, but perhaps calcium sulphide, or ichthyol, may aid in arresting the formation of pustules. But local treatment is, after all, the most important. Now, there are some things which you are likely to confuse with ordinary acne. Perhaps the commonest is the rash which comes from the administration of iodides or bromides. A mild eruption of this kind takes the form of small red papules on the face, which look like ordinary acne, and are, I suppose, actually due

to an inflammation of the sebaceous follicles. But it does not begin with the formation of black-heads. A severe drug rash of this class is more acute than acne, and on the surface particularly there is more pustulation and formation of crusts; sometimes there are blebs, which are never seen in acne. I show you a picture of a fairly severe iodide of potassium rash.

I show you also a picture of another disease, known as acne varioliformis. It differs from ordinary acne in the following respects. There are not any comedones. The disease develops later in life. It is especially apt to affect the forehead, and also the hairy scalp, which ordinary acne never does. The papules are often grouped; the top of them necroses and a scab forms, and when this falls off a scar remains like that left by small-pox; and that is why it is called acne varioliformis.

I now pass on to the disease which is called acne rosacea. It really has not much connection with common acne; hence it is better to call it simply rosacea. Apparently it originates in vasomotor disturbances—repeated “flushings” of the face—which lead to a chronic congestion. The vessels, especially the small veins, become permanently dilated, and on the affected area papules form, possibly in connection with over-stimulated and inflamed sebaceous glands. (The formation of papules, though a secondary process, suggests a certain resemblance to ordinary acne.) Finally, the congested tissues become thickened; an extreme development of this may sometimes be seen in the nose, which may be enlarged, lobulated, and pendulous (rhino-phyma). The parts chiefly affected by rosacea are the tip of the nose, the chin, the sides of the nose, and the adjacent parts of the cheek—that which is known as the “flush area.” Occasionally the condition is found also on the forehead. I show you a patient who illustrates this very well. You see there is a chronic congestion of the nose and adjacent parts of the cheeks. Her chin has been bad, but it is now getting better. And here are papules, which you might at first think were those of ordinary acne. But they have not developed from comedones, but appear to be secondary to the chronic congestion of the face. Rosacea differs from ordinary acne as follows: It generally affects older people; as a rule, there are no comedones; and it is far more dependent upon disturbances of general health,

and especially of the digestion, than upon local conditions. The reflex flushings which initiate this complaint are due mainly to disorders of the stomach, to indigestion from whatever cause, but above all indigestion from the abuse of alcohol. Perhaps the alcohol may have also a direct effect in dilating the superficial vessels. Another cause is disordered menstruation in women, and the vascular disturbances connected therewith; a patient with rosacea is nearly always worse, even at normal menstrual periods. Exposure to inclement weather or to intense sun certainly is bad for rosacea, and may, perhaps, originate it. Lastly, there are a certain number of cases where none of these causes appear to exist. At any rate, it is most unjust to suppose that because a patient has acne rosacea therefore he or she necessarily is a chronic alcoholic. I know a young lady who is quite above suspicion of that kind, perfectly well in her digestion, perfectly regular in menstruation, but she has suffered since she was a child with the most disfiguring rosacea. It has been suggested by Unna recently that the cause, or at all events one of the contributing causes, of all rosacea is seborrhœa, and it is certainly worth while, particularly in those cases where there is a lack of obvious cause for the disease, to look at the scalp to see if you can find traces of seborrhœa. The treatment of rosacea differs from that of acne. Just as the local treatment in ordinary acne is most important, so in rosacea is the general treatment. You must cut off all alcohol and all highly-seasoned dishes, and insist on a simple, easily digestible diet. The bowels must be kept regular, and drugs given which act on the stomach as sedatives, such as bismuth and soda. Dr. Payne thinks bromide of potassium has a particularly favourable effect when it is combined with bismuth and soda; and some think that ichthyol has the property of controlling the vascular disturbance. Locally, you must protect the face from irritants and use astringent lotions, such as lead or zinc, or, as in ordinary acne, sulphur lotions. Veins which have become permanently dilated may be either divided or destroyed by electrolysis.

I have little time left for the cases of lupus. In lupus the face is by far the most frequent point of attack, though it is not the sole point. True lupus, *Lupus vulgaris* as it is sometimes called, is a primary tuberculosis of the skin. When I say

primary I mean to distinguish it from the tuberculosis which spreads into the skin from sub-jacent tubercular foci, such as glands, joints, or bones. Lupus begins as a deposit in the true skin, underneath the epidermis. Here it commences as a small nodule, the minute structure of which is practically the same as that of miliary tubercle elsewhere. That is to say, in the centre of it you find generally giant cells, or a giant cell, and in or near them tubercle bacilli. But these latter are scanty and extremely difficult to demonstrate. Still, the fact that tubercle bacilli have been found in these lesions seems to stamp the disease as tubercular. The centre of the nodule contains also masses of badly staining, degenerating cells; the periphery consists of a zone of small deeply-staining cells, and around this, again, are numerous small blood-vessels, but these vessels do not penetrate deeply into the growth itself. All that is very much what you will find in miliary tubercle elsewhere. And, just as in the case of miliary tubercle elsewhere, the course of it may be very different in different cases. Thus, inflammation may set in around it, giving rise to catarrh, crusting, and scabs or to ulceration, superficial or deep. Or there may supervene a slow fibrotic change which without obvious ulceration gives rise to superficial scarring.

Clinically, lupus often is first brought to our notice as an indolent patch of reddened, thickened tissue, upon the nature of which it may be very difficult to pronounce. Scarring or loss of substance, if present, is the best mark of distinction from chronic eczema; chronicity, age of onset, and non-reaction to internal treatment distinguish it from syphilitic disease. The best positive proof of lupus, however, is the demonstration of the nodules of lupoma, as I will now show you. Here is a case of lupus of the face. True, the patient is an elderly woman, but you must note that she has had it since early life. On her cheek is a large area of superficial scarring; round this is a zone of reddened, infiltrated tissue. By pressing a watch-glass firmly on this part I can temporarily remove the hyperæmia, and you can see in the skin yellowish-brown spots about the size of a pea. These, which are called by Mr. Jonathan Hutchinson "apple-jelly" deposits, are the actual nodules of lupus tissue. I need not tell you that lupus is not always so mild a disease as in this patient. It does not always limit itself to superficial ulceration

and scarring, but sometimes goes on to extensive and deep ulceration, or to a chronic infiltration of the skin which is highly disfiguring. I hoped to have been able to show you such a case of bad lupus, and for this purpose I generally go to the electrical room, whither they mostly gravitate; but Dr. Walsham cannot supply one to-day. However, I show you a picture of a case which is ulcerating, and another where the face is covered with crusted discharge, and a third which shows a thickened nodular patch of chronic inflammation. And here, again, is a picture of an early case of lupus, which shows you very well the features I spoke of first.

Here is a picture of another form of disease, generally called Lupus erythematosus. It is a pity it bears the name lupus, because the probabilities are that it has little essential connection with true lupus. There are no tubercular deposits in the skin. There is, however, an infiltration with small cells, particularly around the vessels of the cutis and the sebaceous glands; and this may result in a superficial scar like that of lupus. One recognised position for lupus erythematosus is, as in the picture I show you, over the bridge of the nose and upon either cheek. There it forms the well-known "butterfly patch." But it has not always that distribution. Sometimes it occurs in discrete circular patches on the face, or, indeed, on other places than the face—for instance, on the scalp, the ears, and the backs of the fingers. Here is a patient who has Lupus erythematosus. On her face are two reddened, dry, scaly patches, slightly thickened and raised, but without ulceration or scarring. On the scalp is a large area quite bald, slightly scaly, and evidently extensively scarred. Whatever you think of the face, the scalp leaves little doubt as to the diagnosis; for true lupus, so far as I am aware, does not attack the scalp. Again, true lupus begins at an early period of life, whereas Lupus erythematosus usually begins later on. This particular patient was twenty-one when the disease began; perhaps that does not help us much. She has none on the ears nor on the fingers, nor has she chilblains, a complaint to which patients with Lupus erythematosus are rather prone.

I will conclude by showing you two cases where the diagnosis is a little uncertain. Here is a woman with two rounded patches of chronic inflammation on her face which show some slight loss of

substance and some scaling. The question arises, and has arisen ever since I have seen her, as to what the exact nature of her disease is. It was suggested that it might be true lupus. I do not think it is, partly because no lupus nodules can be demonstrated (in the way I have just shown you), partly because it has developed rather too late in life—she was thirty years of age when it began. Another possibility is, might it not be a tertiary syphilid? The stationary character of the disease, the absence of ulceration, and the lack of all confirmatory evidence of syphilis are against that diagnosis. The only thing which remains is that it may be Lupus erythematosus, and I think that that designation must cover it.

Here is another case the nature of which I am not sure about. She is a middle-aged woman, a monthly nurse, and, looking both to her general appearance and to these large symmetrical patches on her cheeks, made up of small dilated vessels, you will probably diagnose “acne rosacea.” Still, in rosacea it would be unusual to have such marked affection of the cheeks and none of the nose or chin. Again, close inspection of these congested patches shows in their centre a slight superficial scarring. I do not think this occurs in rosacea. But there is a form of Lupus erythematosus whereof the main clinical feature is the dilatation of small superficial vessels, but which nevertheless runs on to scarring, just as does the common form of this disease. I am tempted to think that this is a case in point. I ought to mention, however, that the patient says that formerly there was a slight discharge from these patches, which I presume would tell both against rosacea and against Lupus erythematosus. But I have seen none, the face having been always in the condition which you now see.

Under the microscope you will find specimens of acne and specimens of true lupus.

For Mosquito Bites.—Schill recommends to apply a little sodium bicarbonate, moistened to a paste, to take the sting out of a mosquito bite. It may be used in a concentrated solution. To drive the insects away, he swabs the exposed parts with a 2 per cent. solution of thymol. He has found these measures very effectual against mosquitoes and gnats.—*Journ. A. M. A.*, vol. xliii, No. 14.

SOME THOUGHTS ON FOOD AND EXERCISE.*

By W. J. TYSON, M.D., F.R.C.P.,
Physician to Folkestone Hospital.

GENTLEMEN,—I think that many of us, perhaps most of us, do not pay that amount of attention to what is called general health which the subject demands and deserves.

There is no doubt that the length of life has increased during the last fifty years under the improved and improving knowledge of sanatory conditions; there is still, however, much more to be done and said in this matter.

The importance of good air, proper food, and suitable exercises for all periods of life transcends in importance everything else in the whole range of medicine and surgery; yet probably it is on account of the “commonness” of the above, and also because everybody thinks he knows about them, that there has not been more rational and definite instruction given.

Some years ago it was doubted whether anyone had really reached the age of one hundred years, but now we have on record several authentic cases of the above age, and to-day there are people living, well and strong, who have completed their century.

To live to a good age and not to enjoy life seems to me to a great extent useless, and I feel sure that most of the bad health we meet with after fifty is due largely to most unwise dieting, and to not taking a regular and proportionate amount of exercise.

The life between forty and seventy, and even up to eighty years should be enjoyable, and work should be a pleasure and not a burden, as it is now in many cases. After forty there is a tendency among all of us to neglect the taking of exercise, and at the same time to continue our old diet tables. Now, to enjoy this second half of our life, a preparation for it must be made in the first half by a regular and systematic training of the whole man, body, mind, and soul, and the proportion and order of development of each of these parts should be easily understood and carried out.

* Read at Rochester before the members of the West Kent District of the South-Eastern Branch of the British Medical Association.

In my short notes I am only dealing with the body, and if this be carefully and successfully attended to, the highest parts of our nature, viz. the mind and character, will have a fuller chance of their development and growth when taken in hand.

The subject of ventilation I shall not dwell upon ; it has received probably more attention from the public and ourselves than that of food and exercise, and the result is seen every day in the diminishing of deaths from the various forms of diseases included under the term of "tuberculosis."

I will now go on to say a few words in relation to our food.

During the last few months I have read a good deal on this subject, and I may say that some of the methods I have tested on myself.

It seems necessary in these days in order to obtain a hearing on any particular subject that one must hammer away incessantly and in a very loud manner. I find that men who write on diet have each a particular line, and each one thinks that his *confrère* is wrong. The one who writes on the non-animal diet tells you if you follow the system, all your diseases and complaints will disappear, and you will ever hereafter be well. Another writes as a starvationist, and one immediately thinks what a vast amount of good food has been wasted, and money unnecessarily spent. A third advises the almost total abolition of starch and sugar, declaring that to the eating of these foods are due cancer, bronchitis, pneumonia, etc. ; whilst a fourth ascribes the same terrible results to an animal diet. And so I might go on.

What I feel, after having read these books and given a good deal of thought to them, is this : that there is much truth in all of them and much exaggeration. We are apt to forget that the body is not a machine, but a living organism ; that whereas two machines can be made exactly alike in every detail, no two human bodies have ever been constructed alike. What suits one person does not by any means exactly suit another. Food, quality and quantity, must vary with the individual, with the time of life, and with his mode of life, and with the climate he is living in. No diet table can be or should be for many days exactly the same.

I think it is unfortunate that many of us do not seriously think about these questions until perhaps we begin to put on too much flesh, or find

that the power of exercise in many ways is leaving us. If we were properly taught at 20 and we really carried out the lessons, then the early increase of flesh and a disinclination for exercise might, I believe, be longer postponed.

As regards the quantity of food, I find that most writers are agreed that too much is almost invariably taken, and there seems little doubt this is true ; the cause of this is perhaps due principally to this, that whilst in the evolution of the race so much care has been given to the cultivation of the mind, the diet has continued the same ; although much less strain has been thrown upon the physical parts of the body, and consequently less albuminous substances are required. Yet this statement requires much modification, for when the body is being built up a full diet is necessary, but it must be an assimilative one.

The effects of excessive alcoholic drinking are always more apparent than excessive eating ; the former, whether in an acute or chronic form, show themselves in many ways, and a drunken man is an object-lesson which no amount of over-eating is capable of producing. The moral effects of over-drinking are worse than the results of surfeiting, hence the *raison d'être* of temperance societies ; but the over-fed man is no less wearing out his internal organs than the alcoholic—the mill in the former grinds more slowly, but no less surely.

The amount of nitrogenous food eaten should vary with the amount of motor power given out—the more force expended the more fuel is required, and this should be of as an economical a kind as possible to save the organs from wearing out too quickly. Anyone who is in the habit of walking or playing out-door games of any kind soon discovers the different motor values of foods—books may help in this matter, but practical experience is of more value.

I have often watched the huge meat dinners that many of our hospital patients obtain when in bed, practically the same amount in quality and quantity as when they are at work ; fortunately for themselves a bilious attack or diarrhoea often supervenes to relieve the surfeited organs, or the house surgeon plies them with the old white mixture.

My own experience tells me that some kind of meat is better for moderate and prolonged exercise, although excellent substitutes will be found in eggs, cheese, brown bread, etc. I have tried porridge,

milk, vegetables, etc., but the quantity required to produce the same force as with meat is too great for me, and the distension caused is a distinct drawback and is mechanically uncomfortable.

When working mentally and taking little or no exercise, less meat should be consumed and is best eaten in the middle of the day; for dinner, fish, or even game, is pleasant, and I believe useful. If I were to state my own diet when in work it would be something like this: For breakfast, eight o'clock, a rasher of bacon, one egg, toast and butter, with coffee and milk, equal parts; luncheon at one o'clock, consisting of meat, vegetables, light farinaceous puddings; at 4.30 a small cup of tea; and dinner, about 7.30, consisting of soup, fish, game, light puddings. If much mental work were to be done in the afternoon, I would recommend the omission of the meat in the middle of the day, and take instead a light pudding with cheese and milk, and then afterwards a larger meal in the evening. But I cannot say too strongly that there is absolutely no one rule about foods to be observed by all. The amount of work, whether mental or physical, the season of the year, whether warm or cold, the climate, the time of life, the individuality of the person, and other things must be taken into account.

I deprecate too frequent meals; three a day should rarely be exceeded, and on an average at intervals of four to five hours.

I have often noticed that many people never seem to have finished eating, and it would be difficult to say what amount of rest the stomach ever obtains. Surely the stomach is a long-suffering and forbearing organ; but in many cases it has a terrible revenge in setting up a lasting and almost incurable dyspepsia, or what is worse, a carcinoma.

I think that many doctors who write so urgently about plain diets forget often the great attraction that the mere pleasure of eating has for a large number of people.

The organs of sense and taste, like other organs of sense, are developed with varying degrees of sensitiveness in people, and the so-called "pleasures of the table" have a real meaning to some but not to others.

There are a great number who do not wish and never intend to give up these pleasures, and know well that the indulging of them tends to increase their satisfaction. No amount of preaching or

teaching on moderate and judicious feeding will affect these people, and I am not so foolish as to think or believe that anything I write or say will do so.

On the other hand, there are a very large number of people who eat unwisely from want of knowledge on the subject, and did they know the consequences that will follow later on their present mode of living would gladly submit to any beneficial change in their dietary.

If there is one class of persons more than another who should try and keep well, it is the medical profession—a profession probably more trying and wearing to the nervous system than that of any other profession, the members of which can rarely retire until comparatively late in life. If we are poor, it is necessary for us to be well. It has often been said that the members of our profession have more hobbies, whether they be out-door ones, or those of art, science, or literature, than any other section of the community, and to enjoy these nothing is so helpful as good health; and there is nothing that tends towards this so much as careful feeding.

Exercise.—It would be well if every man were trained in early life to some form of outdoor recreation, for it is often difficult in middle life to take one up from lack of early training, which is really necessary to the full enjoyment of it.

Health is enormously strengthened, work is rendered more pleasurable and of a higher order, when moderate and judicious exercise is systematically carried out. There are some men who practically do nothing else than play all the year round, who live for this, and these naturally excel in games. Very few men are able to lead purely physical lives for pleasure, and it is right that this is so. We are not animals in this respect, and exercise should be taken to keep the body in health, so that the mind and character may have more play, and be more fitted to do their work.

There are many kinds of exercise fitted for the various times of life; to many they come naturally and are enjoyed, to others it seems that all forms of exercise are irksome. Games are more enjoyed in early life—at any rate, the more active ones; but there is a strong tendency when middle life is reached to slacken off, and get what is called lazy. Of course a good deal of this disinclination is due to the lessening of

the elasticity of the tissues and to the increasing of the body weight, both of which, however, I believe are brought on earlier than need be by the absence or want of due training of the body.

Then, again, there is that bugbear which we hear everywhere, especially in our own profession, of "no time" and "I cannot afford to do it."

Now, I have often argued and talked with men on this subject of "no time;" and at once I admit if one is going to take systematic exercise, say one or two afternoons a week, one must be prepared to lose something professionally in the present; but consider for one moment the other, and what we may call the philosophical, side of the question. In the first place, there is a distinct gain of health, and if persistently and consistently carried out, a maintenance of it; work for a longer period can be carried on, and the quality will not only be maintained but increased. What the public requires of us, I venture to hope, and in many cases I believe, is good work rather than much indifferent work, and when they do this our reasonable recreation will not in the long run affect our position with them.

Now, the question naturally arises when discussing this subject, what forms of exercises are to be recommended; these must depend on our age, on our aptitudes, our early training, the place we live in, and perhaps on our incomes.

It is almost useless to play cricket, fish or shoot, unless taught these in early life; but there are many things, such as riding, golf, fencing, gymnastics, cycling, which can be taken up much later in life than the former. Every man must decide for himself the kind that he will take. My desire only is to urge that every one if possible should adopt one or more of the above.

It is important that the exercises should be regularly practised; but as many sports can be only enjoyed for a portion of the year, such as cricket, shooting, etc., then these should be supplemented by some other kind of sport, such as cycling, walking, fencing, etc., during the remaining parts of the year.

I believe that it is a wise thing to get quite away once a week from one's work, where there is a change of air, of scene, and of people. There are many sports which allow of this, such as shooting, including rifle-shooting, golfing, cycling, etc.; after these outings we certainly return fresher in every

way and with greater relief and keenness than if the recreation was taken in our own homes. But if this absence from home is prevented from any cause, then we can fall back on tennis, cricket, net practice, fencing, etc.

I once heard it said by a well-known physician that if sea-water was not so common and accessible it would be a great deal more used in balneology than it is now; the same may be said of sea-fishing. There is a good deal of real amusement and sport to be obtained at any of our sea board towns in the way of fishing, sailing, and rowing.

The sea is practically a freehold; there is no rent to pay for the use of it, and the game you catch is free of charge.

I have only been aware quite recently of the quantity, quality, and varieties of fish that can be caught on our seaboards, and at comparatively small expense.

I have been induced to write these few rough notes by noticing for some years past the indifferent states of health that one meets with in middle life and old age.

Few people can possibly enjoy the later years of life without preparing for it in the earlier periods.

I have written on two subjects only—food and exercise—which when carefully attended to will affect our well-being more than anything else.

The body being well, the higher parts of our nature will have full and fair play—the mind and the character will then be better fitted to fulfil their high destinies.

WE have received from Burroughs, Wellcome & Co. specimens of their "soloid" mercuric potassium iodide. The powerful antiseptic properties of mercury biniodide are well known, and the "soloid" products of mercuric potassium iodide hitherto issued have been very much appreciated and widely used by medical men as a means of securing the effects of mercury biniodide in solution. In order to extend the usefulness of this agent, "soloid" mercuric potassium iodide, gr. 4.37 (0.283 gm.) is now issued. One dissolved in ten ounces of water forms a solution of 1 in 1000 (frequently known as mercury biniodide solution). The colour of "soloid" mercuric potassium iodide is due to a harmless ingredient added as a safeguard against errors.

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ON CIVILISATION,

A Lecture delivered at Guy's Hospital

By W. ARBUTHNOT LANE, M.S.,

Surgeon to the Hospital, and to the Hospital for Sick Children, Great Ormond Street.

GENTLEMEN,—I propose to consider with you the question of civilisation from the point of view of the surgeon, and to endeavour to find out what price in physical depreciation members of the community pay for the advantages which are derived from it. As far as I understand the subject the chief benefit afforded by it to the individual is a comparative immunity from harm from members or groups of members of the community, and the degree of such immunity would appear to indicate the level reached in the scale of civilisation. The consideration of the advantages derived from it concerns us little surgically. Our share, as members of the community, in the scheme of civilisation is to reduce to a minimum the undoubted harm sustained by individuals and by the community in consequence of the existence of this condition of things.

To determine the degree of physical depreciation which is associated with civilisation, I think the simplest and best method we can adopt is to trace the individual up from birth. The vast majority of children are born healthy, their vigour and size varying with the development of the parents. As a general rule it seems to me that the characters of the male parent are impressed especially on the female children, while those of the mother are transmitted in greater part to her boys. If, however, one parent has an abnormal share of mental or physical development, he or she usually exerts a preponderating influence on the offspring of both sexes.

Unfortunately, amongst large and crowded communities a considerable proportion of parents have been reduced, from causes we will consider below,

a standard which we would generally recognise as one of reasonable size, vigour, and health; consequently the children at birth possess these qualities in a correspondingly subnormal degree.

Very soon after birth in the state of civilisation familiar to us in this country the imperfect nature of the food supplied, which is rarely maternal in origin, produces disturbances of the gastro-intestinal tract with the imperfect nutrition consequent upon it.

Now, in infancy indigestion is a very much more serious condition than it is in adult life; indeed, one may safely generalise by saying that the harm done by disturbance of the gastro-intestinal tract varies inversely with the age of the child. In young life the supply of nutritive material derived from the intestines has not only to meet the wear and tear, but an excess has to be obtained from which to form new tissues, and the growth of the child depends largely on the amount of this excess. As the process of digestion is vastly more active in infancy, the facility with which it is interfered with is correspondingly great and the consequence of such upset is far-reaching and disastrous.

The result of indigestion in the infant is to produce an inflammation and distention of the intestines and irritation and enlargement of the lymphatic glands which drain the tract and through which material passes, probably in an abnormal state, setting up troubles and disturbance in its transit. Associated with these conditions and in consequence of them a varying quantity of serous fluid is thrown out by the irritated peritoneum.

What are the several consequences of this?

1. The imperfect supply of nutritive material lowers the resisting power of the individual to the entry of organisms into the tissues; and this reduction in the fighting capacity of the cells is made more manifest by being assisted by some local damage, such as is produced by diapers containing irritating chemicals, decomposing urine, imperfectly digested intestinal contents, or accumulated excretions from the skin. These produce the redness or superficial ulceration so commonly seen about the buttocks or folds of children. The same causes are responsible for the growth of the organisms in sour milk on the mucous membrane of the mouth and for the ulceration so often present there.

2. The distention of the abdominal wall by its contents being in excess of the resistance offered by it, fluid or intestine or both are driven into

the yielding recent umbilical cicatrix or along the funicular process of peritoneum into the tunica vaginalis, or canal of Nuck, producing varieties of hydrocele or hernia.

3. The same distention of the abdomen interferes with diaphragmatic respiration and with the air-entry into the lower part of the chest especially. This consequent diminution in the oxygenation of the blood and tissues reduces still further the means of digesting food and of nourishing the individual.

The improper functioning of the respiratory apparatus allows of its occupation by organisms and the development of so-called catarrhs and bronchitic conditions which still further reduce the oxygenation of the blood. The interference with the function of the abdominal wall consequent on the strain to which it is exposed also renders it more difficult for the infant to expel the contents of the bowel, the passage of which along the intestines is much interfered with by this distention, which necessarily involves a certain amount of kinking and obstruction of the lumen, vomiting, constipation, or diarrhoea resulting.

4. Again, the presence of fluid in the peritoneal cavity and the chronic irritation of the lymphatic glands each form an excellent nidus or cultivation medium in which the tubercle bacilli can establish themselves and multiply freely with very little opposition from such tissues of the body as would in vigorous health and in an area which is undamaged meet and destroy them with facility. Here, again, the risk of such infection varies inversely with the age of the child.

In tubercular infections it would appear that one and generally two factors are necessary for the development of the organisms in the tissues. One is a general depreciation of the vitality of the individual. Such depreciation can, as a rule, be measured or gauged by the amount of air transmitted habitually through the lungs in relation to the size of the individual.

The other is some factor which produces a more local depreciation in the resisting power of a part of the body. This is generally a focus or nidus containing material in which tubercle bacilli can grow easily and undisturbed. Such a focus is often produced by traumatism, the sequence being damaged tissues, extravasation of blood, and inflammation, the last being very materially

aggravated by movement. On the other hand, the local depreciation in the vitality of tissues and the formation of a nidus may be an infective process brought about by organisms other than tubercle, which obtain a foothold and produce an inflammatory focus, these organisms being displaced by, or associated later with, a growth of tubercle bacilli which avail themselves of the shelter afforded by the damage done by the first group of invading organisms.

A consideration of these facts shows how important it is to avoid the development of any inflammation in the body of the young child, and should it exist already to effect its removal as soon as possible. Surgically this can be effected most satisfactorily by rest, assisted if necessary by the evacuation of the culture medium, while in medical conditions a moderate amount of rest can be obtained in a very modified manner by drugs of which opium would seem to be one of the most efficient under certain conditions.

Even when the tubercular organism has established itself, rest assists the tissues of the individual against it, while movement aids the organism as against the cells of the individual.

5. An imperfect or insufficient supply of nutrition not only interferes with the normal increase in the bulk of the child, but also leads to the process of growth of the skeleton being modified in a peculiar manner, this varying somewhat in the several portions of the skeleton with the importance of the special demands which are made on its several parts.

Insufficient nutrition means an imperfectly calcified bone which is softer than the normal, and in proportion as its strength is diminished so it fails to perform its functions properly.

Now, the portion of the young child which is growing most rapidly, and which indeed is by far its most important structure, is the brain. To safeguard the brain the individual will sacrifice the less important bones of the skeleton, the safety of this organ being a first charge upon the bone-forming department. Upon the vault of the skull, which, though of average thickness, is abnormally soft, there develops an arrangement of cancelli placed like the pile of velvet at right angles to the surface of the original skull, this formation in combination with the horizontally placed cancelli of the original vault being obviously most efficient in sheltering the brain from injury.

On the back of the skull on which the feeble child rests in the recumbent posture the process of sheltering is interfered with because of the pressure locally; consequently the original vault alone, unsupported by any new formation, remains there. It is often sufficiently soft to allow of its being bent in by the pressure of the finger. To this condition

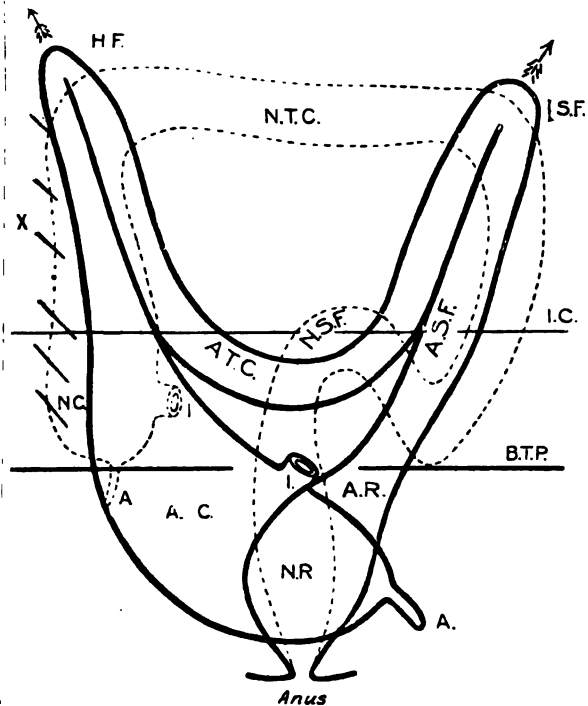


Fig. representing diagrammatically many of the changes which the large bowel undergoes in consequence of the habitual interference with its functions by constipation. The normal condition is shown as a dotted line, while the firm outline illustrates the modifications which take place in consequence of habitual overloading. N.C., N.T.C., N.S.F., and N.R. indicate what may roughly be regarded as the normal caecum, transverse colon, sigmoid flexure and rectum, while A.C., A.T.C., A.S.F., and A.R. represent the same in its altered state. B.T.P. and I.C. show the lines of the brim of the true pelvis and of the iliac crests. The appendix is left free from adhesions or deformity, so as not to render the diagram too complicated. X, Acquired adhesions binding down bowel and terminating above in a false mesentery.

the name "craniotabes" is applied. Fortunately, the portion of the brain beneath this area of imperfect protection is less important than the rest of it.

The shapes of the ends of the long bones are modified in accordance with the law I formulated, namely, that "the rates of bone formation in the several portions of a growing line vary inversely with the pressure transmitted through them." This

is exaggerated by the imperfect nutrition of the tissues and in proportion to the degree of this malnutrition, the material employed being softer and more bulky than normal, and being laid down too rapidly. In this manner the so-called beading of the rickety skeleton is brought about.

Strengthening the long bones and tending to oppose the curves which develop rapidly in them is a surrounding sheath of imperfect callus and thick periosteum.

Should the process of malnutrition be stayed and the supply of material to the skeleton become sufficient, the deformity of the bones is progressively reduced by the formation of completely new shafts, in precisely the same manner that the old shafts are replaced and new ones developed in young children the subjects of fracture and displacement of fragments. The younger the children the more active and more complete is this process of restoration of the skeleton to its normal form after fracture with displacement, or after the deformity resulting from bad feeding. *The skeleton is practically the crystallisation of lines of force; this when exerted in one direction results in the formation of compact tissue, when in various directions by cancellous tissue which varies in complexity with the variation in direction of the lines of force.*

By far the most serious result of the disturbance of the intestines, which goes by the name of "indigestion," is the mechanical interference with the passage of the intestinal contents and their prolonged stay especially in that part which forms the cesspool of the tract, namely the large bowel. Of the large bowel the cæcum and ascending colon form the most important part of the cesspool. Into this segment the small intestine pours its contents, and during the daytime, in subjects who are no longer infants and constantly or frequently in an attitude of recumbency, material collects in it, loading it up and distending the lower end of the dilated bowel, moving it downwards and inwards till it occupies the true pelvis. Recollecting the positions of the viscera taught to us at an impressionable and credulous period of life by the anatomist in what are called text-books, one is rather inclined in a foolish manner to regard the cæcum as being a fixed structure situated in the iliac fossa. For the benefit of those readers whose memory of details may perchance have grown dim I will quote a few lines from the last edition of the very

popular text-book, 'Gray's Anatomy,' on the description of the cæcum: "Its size is variously estimated by different authors, but on an average it may be said to be 2 to 2½ inches in length, 3 inches in breadth. It is situated in the right iliac fossa above the outer half of Poupart's ligament; it rests on the ilio-psoas muscle and lies immediately behind the abdominal wall." Many of what are called varieties are described and they appear to differ in many particulars. They are regarded as congenital or as retrocessions to ancestral types, for reasons that appear to me to be both insufficient and incorrect.

During the prolonged assumption of the erect or sedentary posture of civilised life the cesspool may become very considerably enlarged and distended. When fully loaded by its own weight it tends to descend into the true pelvis. This tendency is more marked in the woman than in the male subject. It is largely exaggerated during the straining which takes place in defæcation. I believe that the form of water-closet in common use is very largely responsible for this descent and for the formation of hernial protrusion in the inguinal and femoral regions. In the savage, and even till quite recently in France especially, the attitude assumed in defæcation was that of squatting on the feet, this being often rendered more easy and cleanly by some mechanical contrivance. Now, in this position not only does the forcible apposition of the front of the thighs against the lower part of the abdomen completely protect the groins from excessive intra-abdominal tension, but the same pressure of the thigh compresses and drives up the cæcum and ascending colon, helping to empty them into the transverse colon, tending also to keep the kidneys, etc., in place, both directly and indirectly by avoiding the strain exerted on them by the forcible descent of the large bowel. Besides, in this position the power of expelling fæces is much more effective than in that usually assumed. From a common-sense point of view it is difficult to understand how the present arrangement for water-closets has come into vogue. As a consequence of their distention the walls of this part of the intestine become slightly inflamed, and adhesions form between the outer aspect of the cæcum and the adjacent abdominal wall, by means of which the upper part of the cæcum and ascending colon are fixed and their mobility

diminished. At two points the strain exerted by adhesions may become excessive, and may result in a very considerable reduction of the lumen of the bowel. The most common place is at the hepatic flexure, and the less common at the level of the iliac crest.

The fixation of the ascending colon and upper part of the cæcum interferes with the normal performance of their free movements, and, in consequence, the muscular coat becomes progressively thinner and less capable of performing its function of emptying the cesspool by propelling its contents. The prolonged assumption of the erect or sedentary posture for the large portion of the twenty-four hours, unvaried by any recumbency, assists in the increase of this disability, and renders the passage of fæces through the flexures, and especially the hepatic, a matter of increasing difficulty.

The cæcum descends as I have already described, and, being somewhat tender and inflamed, it interferes by its presence, and afterwards by an extension of the inflammatory process from it, with the function of the bladder and with the position and with the delicate movements of the ovaries and Fallopian tubes. Constipation appears to me to be largely responsible for the sterility which is so common among women.

The appendix is also involved in the inflammatory process in the wall of the cæcum. If this exists at an early period of life, the appendix may in consequence become attached to the posterior part of the abdominal wall as high up as the kidney or liver, or at a later period it may be fixed along its length to the side or floor of the true pelvis. In the large proportion of cases the proximal half of the appendix becomes fixed to the abdominal wall by adhesions precisely similar to and continuous with those binding down the cesspool externally. Now, the movements of the cæcum during its distention exert an important influence upon the exit of the secretion from the distal portion of the appendix since the distended cæcum exerts upon the appendix at its junction with it a considerable strain. The resistance offered by the adhesions to the proximal part of the appendix produces an abrupt kink in this structure immediately beyond the limit of their attachment, flexing the distal portion abruptly upon the proximal, and producing for the time being a more or less complete obstruction at this point. Such

obstruction may result in an acute inflammation of varying intensity of the distal part, with or without the formation of a so-called calculus, which is merely an accumulation of the inspissated epithelium secreted by the tube beyond the obstruction.

This can be demonstrated more clearly in any case of appendical trouble when an operation is performed between the attacks. A knowledge of the mechanics of the appendix under altered conditions shows the relief which any drug unloading the cæcum so often produces. Possibly the more frequent presence of severe inflammation of the appendix is due to the fact that in the present day doctors do not always administer at the onset of symptoms a blue pill and a black draught, or some similar drug, as was the routine practice, but generally confine themselves to watching symptoms and carefully avoiding any interference with what they consider the natural course of the disease.

The surgical treatment of the conditions of the large bowel which result from chronic constipation resolves itself into the section of adhesions or bands which bind it down and constrict it in every position or only in the erect posture, or the division of the ileum at its lower limit and its introduction into the sigmoid or rectum. The sigmoid under these conditions does not present the same facility for attachment of the ileum that exists normally owing to the extensive pinning down of the bowel, the obliteration of the loop, and the very unsatisfactory condition of the muscular and peritoneal coverings. The rectum is, however, frequently dilated and its muscle wall much thickened. On this account it is often wiser to establish communication between the ileum and the upper part of the rectum, if it can be done with comparative facility.

The ideal treatment in these cases would be to excise the colon as far down as the point where the end of the ileum is attached, so avoiding the entry of gas into the large bowel or the passage of the contents backwards along its length.

This procedure would, however, entail very much more risk than the more simple method of dividing the ileum and putting it into the end of the large bowel, and the balance of risk more than compensates any occasional discomfort from the passage of motion or the presence of gas in the large bowel. When after the establishment of an opening of the ileum into the lower limit of the large bowel there is still very much pain associated with any distention of the cæcum and ascending colon by gas, this segment of the large bowel may be excised safely and with advantage.

A LECTURE
ON
**THE INOCULATION TREATMENT
OF TUBERCULOSIS.***

By **A. E. WRIGHT, M.D.,**

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GENTLEMEN,—There are only two methods by which we may attempt to kill off bacteria in the interior of the organism. We may attempt to kill them off by introducing antiseptics into the organism; or we may try to kill them off by the agency of protective substances produced by the organism. The former method has had its day. It has been tried upon the most extensive scale and has failed. It has in particular failed in tuberculosis. I propose to consider with you the alternative method of treating bacterial infection—the method of immunisation.

I will ask you to note on the very threshold that the method of immunisation is Nature's method. No one recovers from an acute or chronic bacterial disease unless it be by the production of protective substances in his organism; no one acquires protection against a disease except, again, by the production of protective substances; and finally, no one lives in the presence of infection and repels that infection except by the aid of the protective substances of his blood.

It is of the utmost importance that it should come home to you that we are dealing here, not with mere speculation, but with a generalisation which rests upon a large body of verifiable fact. By the aid of a comparatively simple technique—technique which I have from time to time described in the scientific journals—it is now possible, not only to demonstrate in a drop of blood drawn from the finger the protective substances which come into consideration in connection with all our ordinary bacterial diseases, but also to measure the content of the blood in these substances in an accurate manner. By the help of these methods every laboratory worker will, I think, be able to satisfy himself (*a*) that the blood of those who become the subject of a bacterial invasion is

deficient in protective substances; and (*b*) that by an injection of corresponding bacterial vaccines the content of the blood in protective substances can in practically all cases be increased. I propose to point out to you that this can be done in the case of those who are already the subjects of tubercular infection.

Let me at the outset define for you the technical terms which I propose to employ, and then briefly rehearse the first principles of the physiology of immunisation.

Protective substances may be defined as substances which enter into destructive chemical combination with bacteria, or, as the case may be, with other foreign elements introduced into the organism, either directly into the blood-stream, or by hypodermic injection. Such protective elements are never absent from the blood. We can, for instance, in the case of every sample of human blood demonstrate the presence in it of protective substances which enter into chemical combination with the tubercle bacillus. We may signify the fact that these protective substances turn towards and enter into chemical combination with the tubercle bacillus by denoting them, in conformity with the convenient system of nomenclature devised by Ehrlich, as tuberculo-tropic substances.

A vaccine is any chemical substance which when introduced into the organism causes there an elaboration of protective substances. I can put it more precisely if you will let me put it into technical language. A vaccine is a substance which induces in the organism an elaboration of bacterio-tropic elements; a tubercle vaccine a substance which induces in the organism an elaboration of tuberculo-tropic elements.

We may now take a further step and inquire in what manner the introduction of a vaccine into the system is interrelated with a new formation of protective substances in the organism.

The interrelation appears to be this. The bacterial substance inoculated—and the bacterial vaccine is always a derivative of the bacterial protoplasm—enters into combination with the bacteriotropic elements already present in the organism, and thus withdraws from the organism a certain quantum of protective substances. Under the stimulus of this deprivation the cells of the organism are stimulated to activity, with the result that the bacteriotropic substances which have been

* Delivered at St. Mary's Hospital to the party of French Physicians and Surgeons visiting the London Hospitals, October 11th, 1904.

withdrawn are replaced with usury. This theoretical conception, whatever may be its value, will serve at any rate to impress upon your minds the sequence of events that can be actually observed to occur. Immediately after the injection of the vaccine there supervenes, as shown by me first in connection with anti-typhoid inoculation and afterwards in connection with anti-staphylococcus and anti-tubercular inoculation, a negative phase—that is to say, a phase in which there is a diminished content of protective substances in the blood. That negative phase is succeeded by a positive phase characterised by an increased content of protective substances in the blood. This inflowing wave of protective substances rapidly flows out again, but leaves behind in the blood a more or less permanently increased content of protective substances. I have spoken of this whole sequence of events as the “law of the ebb and flow and reflow and maintained high tide of immunity.”

All this has reference to the effects of a single inoculation undertaken with a dose of vaccine which is sufficient to produce a certain constitutional disturbance. When only a small dose of vaccine is inoculated the negative phase may be so fugitive as hardly to appear on the record, but the positive phase will be correspondingly diminished. When an unduly large dose of vaccine is inoculated the negative phase is prolonged and much accentuated. The positive phase may in such a case even make default.

We have here earnest reason for considering the question of dose. It will be obvious that if we, in the case of a patient who is already the subject of a bacterial invasion, produce by the injection of an excessive dose of a vaccine a prolonged and well-marked negative phase, we may, instead of benefiting the patient, bring about conditions which will enable the bacteria to run riot in his system.

If attention to dose is essential in the case of a single inoculation of a bacterial vaccine, much more is it essential where we undertake a series of successive inoculations. We are in such a case superposing the effect of one inoculation upon the other. Now, consideration will show that we may obtain, according as we choose our time and our dose, wisely or unwisely, either a cumulative effect in the direction of a positive phase or a cumulative effect in the direction of a negative phase. We may, in other words, by the agency of two or more

successive inoculations, raise the patient by successive steps to a higher level of immunity, or, as the case may be, bring him down by successive steps to a lower level. We can select the appropriate time and dose with certainty only by examining the blood and measuring its content in protective substances in each case before re-inoculating.

If we omit such measurement and work in the dark, our sequent inoculations may quite well fall upon a negative phase period when the content of the blood in protective substances is still below par. In such a case negative phase would be superinduced upon negative phase, and cumulation would take place in the direction of diminishing the patient's resistance. The dangers which might be associated with such a cumulation in the direction of the negative phase are, I think, more than sufficiently exemplified in the fatal results which have in some cases supervened upon the inoculation of progressively increasing doses of Koch's old tuberculin.

You will, perhaps, think that the chances of cumulation in the direction of a negative phase are very remote if during the course of inoculations the clinical symptoms are watched. No doubt when you have produced a serious negative phase effect the fact will be intimated to you by clinical symptoms. My point is that that warning will be conveyed to you too late. It is conveyed to you only after you have lost the advantage gained by the foregoing inoculations and undone all the good you have done. The results obtained by Madsen and Jörgensen by a daily repeated inoculation upon animals of quite small daily doses of a bacterial vaccine exhibit very clearly the risks associated with any mechanical scheme of inoculation. In each case the initiation of a series of inoculations was followed by a progressive rise in the protective substances of the blood. But sooner or later a day arrived in each case when the machinery of immunisation had made its maximum response. When that point was arrived at the further inoculations served only to bring the content of the blood in protective substances down with a run. If I plot out to you in a graphic manner what was obtained in Madsen and Jörgensen's experiments, you will see that small daily inoculations gave first a gradually ascending curve which passed up into a steep peak, and suc-

ceeding immediately upon this rise an equally steep fall, terminating in a more gradual slope. You may conveniently think of this as a roof-tree curve. Your human patient, who has been raised to a higher level of immunity by successive small inoculations, will, in like manner sooner or later, if too much is required of him, cease to respond to your inoculations, and simply slide down the slope of a "roof-tree" curve. If you have not been measuring the content of his blood in protective substances, your patient may probably have arrived at a lower level of resistance than that from which he originally started before symptoms of intoxication draw your attention to the fact.

These fundamental principles of the art of immunisation having been made clear, I will pass on and consider with you the question of the tubercle vaccine.

You will remember that I defined a bacterial vaccine as a substance which was capable of inducing an elaboration of anti-bacterial substances in the organism, and a tubercle vaccine as a substance which was capable of inducing an elaboration of anti-tubercular, or, as I prefer to call them, tuberculo-tropic substances. I indicated also that every bacterial vaccine is derived from the corresponding bacterial culture. Such vaccines need not, as was assumed by Pasteur, consist of living cultures. It has been adequately established in connexion with many bacterial vaccines that their vaccinating efficacy is not impaired by sterilisation by the action of moderate heat (60° C.) I would lay stress on the fact that this holds true also in connection with tubercle vaccine.

We pass to consider in what form a tubercle vaccine is accessible. It is accessible in the form of Koch's T. R. tuberculin. This consists, I may remind you, of a fine tubercle powder (obtained by comminuting tubercle bacilli by the action of machinery) which has been brought into suspension in definite quantity (10 mgr. to 1 c.c.) in dilute glycerine.

You can, as already indicated, provide for the efficient sterilisation of this vaccine without impairing its efficacy by heating the preparation to 60° C. for one hour. Most of the inoculations I have undertaken have been with a vaccine thus treated. I, however, propose hereafter to experiment with a vaccine which I have recently made on exactly the same lines as the staphylococcus and typhoid

vaccine—to wit, a simple sterilised suspension of tubercle bacilli standardised by the procedure for enumeration under the microscope which has been described by me elsewhere.*

I pass from the question of the vaccine to the question of the dosage, and in particular to the question of the scheme of operations. In order to arrive at the scheme of operations to be adopted in the therapeutic application of the vaccine to those who are the subjects of tubercular infection we have to consider the conditions with which we are confronted. The tubercular patient has probably at the onset, as compared with the normal man, possessed a deficient power of resistance. Again, he has in most cases not responded to infection by any increased elaboration of protective substances. This was, at any rate, the condition of affairs in the seventeen cases of localised tubercular infection which I have tabulated in the Royal Society's 'Proceedings,' vol. lxxiv, October, 1904.†

In dealing with these cases the following will appear to be our proper line of policy. We have by increasing the content of the blood in protective substances to try to forestall any dissemination of the tubercle bacilli by the channel of the blood-stream. Further, we have to try to inhibit the growth, and if possible to bring about the destruction of the tubercle bacilli in the local nidus of infection by leading through that nidus in a continuous stream a lymph rich in protective substances.

I may point out in this last connection that protective substances are continuously withdrawn from the lymph as it comes in contact within the infected tissues with the invading bacilli. Captain Douglas and I have shown in the papers already referred to that the stagnant lymph in an ordinary abscess contains hardly a trace of anti-bacterial substances, and that the evacuation of the contents of an abscess and the application of fomentations effect a douching of infected tissues by a lymph whose content in protective substances is not less than that of the circulating blood. Further, it has

* 'Lancet,' July 5th, 1902.

† There is, it is to be noted, also another class of cases where the phenomena are apparently complicated by processes of self-immunisation comparable to those found in connection with general infections. This class of cases, which numbers among it many of the subjects of chronic phthisis, is here provisionally left out of consideration.

been shown by us in a case of tubercular peritonitis that the fluid contained in the peritoneum was five times poorer in protective substances than the patient's blood. In connection with this, we put forward the suggestion that the evacuation of the old and stagnant lymph and the transudation of new and potent lymph from the blood-vessels furnished the probable explanation of the advantage which is so often obtained in tubercular peritonitis from the evacuation of the ascitic fluid.

In the scheme of operations sketched out above we must count as time lost to the patient any period during which the protective substances stand in his blood at the low level at which those substances are wont to stand in the untreated patient.

We must count as a period of retrogression for the patient any period during which his protective substances sink below the ordinary low level of his untreated state.

We must count as a period of progress for the patient every day during which the content of his blood in protective substances stands at a higher level than that of his untreated state.

Lastly, we must deduct from the period of progress every hour when by reason of the stagnation of the lymph circulation in the seat of infection the protective substances of the blood cease to come into application upon the tubercle bacilli in the foci of infection.

Only those who will ruminate upon these points will appreciate to the full the difficulties which confront the immunisator.

I hope to be able to convince you that, these multiform difficulties notwithstanding, it has been possible in nearly every case to gain some advantage from the injection of the tubercle vaccine, and in some seemingly desperate cases to achieve what will, I think, appeal to you as complete success. I think the cases I propose to show you warrant us in hoping for even better results in the future, when the programme which I have sketched out shall have been more closely adhered to, than it was possible to do in connection with these first tentative efforts.

Before I deal with the cases I would turn aside for a moment and consider with you what has emerged with respect to the protective substances of the blood.

When I addressed myself, two years ago, to the

study of the protective substances which come into consideration in connection with the tubercle bacillus, nothing was known about these beyond the fact that it was possible by the aid of the so-called homogeneous tubercle cultures of Arloing, and also by the aid of homogeneous suspensions of a tubercle powder (made by Koch by the trituration of tubercle bacilli) to obtain in certain instances—in particular, as Koch showed, in the case of patients who had been treated with his T. R. tuberculin—an agglutination reaction comparable to that obtained in connection with typhoid fever and anti-typhoid inoculation.

A fallacy in the form of spontaneous agglutination was associated with the technique prescribed by Koch. It, however, emerged in the course of my work that this fallacy could be avoided by employing in lieu of the physiological salt solution used by Koch for the suspension of his powder a salt solution ten times weaker. I may, perhaps, claim that by attention to this point, and by the adoption of the system of technique described by me in the 'Lancet' of July 25th, 1903, the difficulties associated with the measurement of the tubercle agglutinins in the blood have been overcome.

Until some months ago the measurement of the content of the blood in these tubercle agglutinins constituted the only means of obtaining information from the patient's blood with regard to the success or ill success of the attempted immunisation. The investigation of the blood by that method gave all too dim a light.

Of late, working on the problem as to how the organism protects itself against those numerous species of pathogenetic micro-organisms which offer absolute resistance to the bactericidal action of the serum, and in particular on the problem as to how the human organism protects itself against tubercle and staphylococcus infections, and as to how it reacts to the inoculation of tubercle vaccine and staphylococcus vaccine, I have found, in conjunction with Captain Stewart Douglas, that there exists in the normal serum, and there exists in larger quantity in the serum of the successfully inoculated patient, an element which enters into chemical combination with the staphylococcus, the tubercle bacillus, or other micro-organism, in such a manner as to prepare it for phagocytosis. We have called that protective element an *opsōnin* (Latin, *opsōno*—I cook for table, I prepare pabulum

for). We have demonstrated that phagocytosis cannot take place apart from the action exerted by the specific opsonin upon the micro-organism, and we have shown that opsonic action is destroyed by heating the serum to 60° C. In this opsonin we have, it would seem, an essentially important protective substance. It is, further, a substance which lends itself to very accurate measurement. That measurement is effected by a modification of Leishman's method, *i.e.* by mixing together in a capillary tube in each case one volume of the patient's serum, one volume of a suspension of the tubercle bacillus, and one volume of washed corpuscles obtained from the citrated blood of a normal man. The capillary tube is now placed in an incubator for any convenient period, generally for fifteen to twenty minutes. After that period microscopic films are prepared. After appropriate staining, the first thirty to forty white corpuscles which come into view are examined, the number of bacilli ingested by each white corpuscle being noted down. The "phagocytic count" is then arrived at by adding together the number of ingested bacteria and dividing by the number of leucocytes examined. This "phagocytic count" is compared with the "phagocytic count" obtained in films made with the contents of a capillary tube similar in all respects, except in the respect that there has been employed in it, instead of the patient's serum, the serum of a normal person. The ratio in which the phagocytic count of the patient's blood stands to the phagocytic count of the normal blood (taken in each case as unity) is conveniently spoken of as the "opsonic index." By the aid of this method the patient's progress or regress can be very accurately followed.

I have left myself only too little time to go into the history of the patients whom I have here for your inspection, and to supplement what I can show you here by reference to other cases.

CASE 1.—The woman you see before you has, as you see, the aspect of robust health. Her history is as follows: Early in January, 1903—her age being then thirty-three—she was admitted to Mr. Silcock's ward for abdominal pain and distension associated with fever and loss of weight. These symptoms had been first noticed in the previous September. Mr. Silcock operated on January 22nd, the abdomen being opened by a slit incision five inches in length. The typical

appearances of tubercular peritonitis were brought into view and the surface of the intestine was in places studded with miliary tubercles. After the evacuation of a very considerable quantity of fluid the peritoneum was washed out and the wound was closed, a drainage-tube being left in position.

After the operation the fever still continued. It reached 102° F. every evening during the first week; it reached 101° F. every evening for the next fortnight; and it still ranged up to 100° F. every evening two months after the operation. All this time the wound was continuing to discharge, and the patient was becoming very weak and emaciated—being quite unable to turn unassisted in bed.

Treatment by tuberculin inoculation was begun on March 17th. Within a few days the evening temperature had sunk away to 99°, and it came down to the normal on April 28th, and remained normal (except when slightly disturbed by certain of the tuberculin inoculations) for the three months which the patient still spent in hospital. From the beginning of the tuberculin treatment onwards the patient improved in strength and put on flesh. In June she was able to sit up in the afternoons. Her body weight was now 105 lbs. In July she was discharged from hospital, the abdominal wound having now completely healed except for a narrow sinus. The tuberculin treatment was continued, the patient being treated first at home and afterwards as an out-patient.

Six months afterwards the sinus had completely closed and the patient's weight had by March, 1904, increased to 132 lbs. She had, in other words, increased 27 lbs. in weight in six months, and had passed within a year from a seemingly desperate condition to a condition of, I think, perfect health, such as you now see her in.

CASE 2.—The patient who I now present to you is, as you see, a very well nourished woman, *æt.* 43 years, who, perhaps, looks a little pale. She was admitted to the hospital under the care of Dr. Lees, in the middle of March, 1903, complaining of very frequent micturition associated with severe local pain on micturition and dragging pain in the loins, in particular on the left side. The urine contained pus, epithelial casts, and tubercle bacilli in such numbers that they could be demonstrated in large clumps in every field of a microscope in preparations prepared from the

urinary sediment. Examination of the bladder revealed the existence of a large open ulcer. The kidneys were enlarged and tender, the left one in particular was affected, and suspicious signs were detected in the apex of one lung. Tuberculin treatment was begun in the middle of April. The effect exerted upon the body weight during the period the patient was in hospital is exhibited in the column of figures which I have placed on the board:

	lbs.
April 20th	91
April 28th	96
May 11th	92½
May 19th	93
June 1st	96
„ 8th	101
„ 15th	103½
„ 22nd	105
„ 29th	107
July 6th	109½
„ 13th	107½

To one incidental feature in that record I should like to draw your attention. The drop of body weight which is recorded on May 11th coincided on the one hand with the development of increased local pain and symptoms of giddiness and flushing, and on the other hand with a rapid fall in the agglutinating power of the blood, which is displayed on the agglutination curve I have placed on the table. These were all, I take it, symptoms of the supervention of a negative phase dependent upon a too hasty inoculation of progressively increasing doses of vaccine.

After leaving the hospital in July, much alleviated in the matter of pain and frequency, the patient attended as an out-patient, and under the treatment her weight in September, 1903, reached 119 lbs. The tuberculin inoculations have been continued up to recently. All this while the tubercle bacilli, which have been examined for almost every ten days, have become gradually less numerous. Since May last they have completely disappeared from the urine. The patient, none the less, still suffers from serious bladder trouble—due, as appeared recently on examination, to cicatrization and great thickening of the bladder walls, and possibly to some super-added ulceration referable to septic invasion by the bacillus coli and by a Gram-staining diplo-

coccus—micro-organisms which have been throughout present in millions in her urine.

You will see from her good general condition and from the history of the facts I have given to you that the tubercular infection has in all probability been overcome.

CASE 3.—The patient I now present to you is, as you see, a man of about 30 years of age. His history is as follows:—In the autumn of 1902 the patient developed tubercular glands on the left side of the neck and a tubercular abscess on the point of the left shoulder of the same side. He was admitted to this hospital, and was operated upon for the first time in January, 1903. The wound becoming invaded with tubercle and refusing to heal, further operative procedures were undertaken. In all six successive scraping, extirpating and skin-grafting operations were undertaken during the course of the year, the wound becoming in each case re-infected, and the area of ulceration being increased. In December, 1903, when the patient came up for treatment by inoculation, the whole area from the point of the shoulder to the base of the ear, formed a single deep eroded ulcer. The pinna of the ear was half eaten away (you can still judge of that), and immediately underneath it there was a deep crateriform ulcer which looked as if it was going to break into the œsophagus. The left side of the face was distorted by swelling, giving the patient the appearance which would go along with a one-sided attack of mumps. The axilla was occupied by a gland which was as large as a pigeon's egg, and the patient was haggard and very emaciated. As you see for yourselves, he is now, if somewhat sallow, yet a not unhealthy looking man. You will see, as he strips, that the whole of the area I have described to you as previously occupied by the tuberculous ulcer, with the exception of an area about the size of a three-penny piece, which is still covered by scab, has cicatrised and skinned over. You see how soft and elastic that skin is. It differs from the rest of his skin only in being a little pinker. The glands in the axilla can now no longer be felt.

I may mention that, in addition to inoculating this patient with tuberculin, I gave him one or two inoculations of a staphylococcus vaccine with a view to purging the ulcer from the staphylococcus which had invaded its surface. Further, I would point out that I have during the last six weeks or two months succeeded in hurrying up the final processes of repair by painting upon the wound a 20 per cent. solution of gelatine, to which I added 2 per cent. of formalin. This sets into firm, insoluble, antiseptic skin.

In connection with this case, I may perhaps refer to two further cases of tubercular glands to which I have applied the inoculation treatment.

In the first of these cases the patient was a young married woman who had undergone at the hands of two distinguished London surgeons three successive operations for the extirpation of glands. When she presented herself for treatment in January last three or four glands could be felt in the neck, the largest one being about the size of a small walnut. After the diagnosis of tubercle had been confirmed by a test inoculation undertaken with Koch's old tuberculin, the vaccinal treatment with the T. R. tuberculin was inaugurated. After six inoculations conducted with doses which were gradually increased from 1.500 mgr. to a maximum of 1.50 mgr., the glands could no longer be felt and the dragging pains in the neck had entirely disappeared. A period of three months was occupied by these inoculations. Since the date of the disappearance of the glands a few more reinforcing inoculations have been given with a view to preventing any return of the symptoms. Up to the present there has been no recurrence.

The second of the cases of tuberculous glands above referred to was the case of the wife of a medical man. She had suffered from childhood from swollen glands in the neck on one side of the neck. These had become the source of constant dragging pains, and the largest gland, situated under the angle of the jaw, was large enough to produce some disfigurement. In this case also the glands have been very considerably reduced in size, while the dragging pains have completely disappeared and the whole physical condition has improved in a remarkable manner.

I ought perhaps here to point out that if I include in my category of tubercular glands treated, two cases of Hodgkin's disease which were both in a very grave condition when they were taken in hand, I have in addition to the three cases already recounted also two failures to record. In both these cases the diagnosis of tubercular infection was confirmed by a test inoculation of Koch's old tuberculin. In both cases very small doses of T. R. tuberculin (doses of 1.500 to 1.100 mgr.) were employed. In each case very severe constitutional symptoms followed upon every inoculation, and again in each case only a small and transient production of protective substances (only the tubercle agglutinins were measured) was achieved.

CASE 4.—The next case I present to you is a woman with lupus. She has, as you see, lost her left arm, and you can see that the stump of that arm, the sternum, the right hand, and the face and neck on both sides are extensively affected with the disease.

Her history is as follows: She developed a tubercular infection of the glands of the neck at the age of 14. Then suppuration supervened, and the abscesses were opened, the wounds became infected, and other glands also became involved.

Later tubercular disease developed in the little finger of the right hand. The two terminal joints of that finger were removed fifteen years ago, when the patient was 16. About this time lupus broke out on her face and on her left arm and hand. At the age of 19 the patient underwent treatment with Koch's tuberculin. She received three to four inoculations a day (the total of her inoculations amounting to 150). This treatment resulted in violent inflammatory reaction in the patches of lupus, a piece of bone sloughed out of her left arm, and she remained in hospital seriously ill for thirteen weeks. She attributes, and no doubt rightly, the aggravation of symptoms and ultimate loss of her arm to these inoculations. We can see that there must have been produced a cumulative negative phase.

After a respite vigorous treatment was resumed in another hospital. The lupus patches were then frequently scraped and many glands were extirpated from the neck.

In 1900 the Finsen light treatment was resorted to and was persevered in for eighteen months. This effected superficial improvement in the condition of the face and neck, but the disease continued to spread in the deeper structures, and in particular in the bones of the left arm. Finally it became necessary to amputate this limb.

The disease now re-invaded the stump and broke out in the point of the shoulder and in the front of the chest.

Röntgen rays were now tried, unavailingly. Finally, in December, 1903, the patient, who was then in a very reduced physical condition, was referred to me by Dr. Graham Little for treatment by tuberculin inoculations. You see now that the patient is in tolerably satisfactory condition in the matter of her general health. Her body weight has gone up and has reached 141½ lbs., as much as 5 lbs. having on one occasion been gained in the interval between two successive inoculations. The discharge from the sinus over the sternum has practically ceased. The same holds true of the sinus in the stump of the left arm. The open sore on the point of the shoulder has healed up, and the patches of lupus on the face seem to me to be becoming quiescent.

CASE 5.—The patient I now present to you is, as you see, another case of lupus. She has the appearance of a child, but is, she tells me, in her twentieth year. When referred to me for treatment by Dr. Graham Little she was extremely emaciated and no doubt under-fed. Her bones protruded through the skin of her back somewhat after the fashion of the bones in dried fish. The point of her nose, which you now see presents the appearance of healing, was covered with a thick mass of scabs superposed upon a very angry-looking patch of lupus. The angle of the jaw and the front of the neck were occupied by patches of lupus in a similar

condition. These are, as you see, now represented by somewhat swollen cicatrices. Both her feet and her hands were affected with lupus. Her hands in particular constituted a mass of ulceration, the bones of the hand being also affected in many places. The condition of these is somewhat ameliorated.

I have under treatment, or have had under treatment, also other cases of lupus for different periods. I think I can say that every one of them have improved, with the exception of one of the first cases I treated. Here, owing, I think, to the too rapid increase of doses of vaccine, the protective substances (agglutinins) which had developed under the stimulus of the first inoculations were subsequently lost.

And now just a few words in conclusion. I have endeavoured to place before you the principles which ought, I think, to guide us in the therapeutic inoculation of bacterial vaccines. I have dealt more particularly with the results of the application of that method to the treatment of tuberculosis. But I would point out to you that the method is one which has a perfectly general application in connection with localised bacterial infections.

I have here, for instance, an example of the application of the method to the treatment of a chronic staphylococcus infection. The patient I here show you, one of our medical students, is one out of a series of fifty or more patients which I have treated (almost all with complete success) by inoculations of staphylococcus vaccine for different forms of staphylococcus infection. You have here, as you see, to deal with a very severe case of acne. Before inoculation each acne spot became, as it usually does, the seat of a staphylococcus infection and was converted into a pustule. The inoculations, which were undertaken about a year after, have accomplished their purpose. The patient is, as you see, free from every trace of pustulation. Time does not allow even of my outlining the many other practical applications which can be made of the method of therapeutic inoculation with sterilised bacterial cultures. It may, however, interest you to hear that the method has already been successfully applied by me to widely different cases. I may particularise: (1) a case of acute coli infection of the biliary passages, where after removal by operation of an impacting biliary calculus, the fever and jaundice continued, and the bile was flowing away through the external wound by reason, as it seemed, of the plugging of the bile-duct by inspissated mucus; (2) a case of coli cystitis which had continued for sixteen years; (3) a case of a localised infection by the *Micrococcus Melitensis* supervening upon an attack of Malta fever; and lastly (4) a case of pneumococcus infection of the salivary glands which was associated with very

burdensome salivation. In this last case in contrast to the others, amelioration only has been achieved.

References to author's papers dealing (a) with principles of immunisation and the application of these to treatment of diseases by the therapeutic inoculation of bacterial vaccines, and (b) with the technique employed for the measurement of the content of the blood in protective substances:

WRIGHT.—'A short Treatise on Anti-Typhoid Inoculation' (Constable and Co., 1904, 3s. 6d. net). Chapter I.: "On the Principles of Protective Inoculation and the Physiology of Immunisation." Appendix II: List of author's papers dealing with immunisation against bacterial diseases, anti-typhoid inoculation, the measurement of the contents of the blood in protective substances and kindred subjects.

WRIGHT.—"Notes on the Treatment of Furunculosis, Sycosis, and Acne by the Inoculation of a Staphylococcus Vaccine; and generally on the Treatment of Localised Bacterial Infections by Therapeutic Inoculations of the corresponding Bacterial Vaccines." ('Lancet,' March 29th, 1902.)

WRIGHT.—"On some new Procedures for the Examination of the Blood and Bacterial Cultures." ('Lancet,' July 5th, 1902.)

WRIGHT and WINDSOR.—"On the Bactericidal Effect exerted by Human Blood on certain Species of Pathogenic Micro-organisms." ('Journal of Hygiene,' vol. ii, October, 1902.)

WRIGHT.—"On the Measurement of the Bactericidal Power of small Samples of Blood under Aerobic and Anaerobic Conditions." ('Proc. Roy. Soc.,' vol. lxxi, 1902.)

WRIGHT.—"A Note on the Serum Reaction of Tubercle, with special reference to the Intimate Nature of Agglutination Reactions generally and to the Therapeutic Inoculation of the new Tuberculin." ('Lancet,' May 9th, 1903.)

WRIGHT.—"A Lecture on the Therapeutic Inoculation of Bacterial Vaccines and their practical Exploitation in the Treatment of Disease." ('Brit. Med. Journal,' May 9th, 1903.)

WRIGHT.—"On some further Improvements in the Procedures for Testing and Judging by the Naked Eye of the Agglutinating and Bacteriolytic Effects exerted by the Sera of Patients suffering from, or preventively inoculated against, Typhoid Fever, Malta Fever, and Tuberculous Affections." ('Lancet,' July 25th, 1903.)

WRIGHT and DOUGLAS.—"An Experimental Investigation of the rôle of the Blood Fluids in connection with Phagocytosis." ('Proc. Roy. Soc.,' vol. lxxii, 1903.)

WRIGHT and DOUGLAS.—"Further Observations on the rôle of the Blood Fluids in connection with Phagocytosis." ('Proc. Roy. Soc.,' vol. lxxiii, 1904.)

WRIGHT.—"On the Treatment of Acne, Furunculosis, and Sycosis by the Therapeutic Inoculation of a Staphylococcus Vaccine." ('Brit. Med. Journ.,' May 7th, 1904.)

WRIGHT.—"On the Preparation of Microscopic Slides for Blood Films, and of a Protective Antiseptic Skin for the Treatment of Open Wounds." ('Lancet,' July 9th, 1904.)

WRIGHT and DOUGLAS.—"On the Action exerted upon the Staphylococcus pyogenes by Human Blood and on the Elaboration of Protective Elements in the Human Organism in response to Inoculations of a Staphylococcus Vaccine." ('Proc. Roy. Soc.,' vol. lxxiv, 1904.)

WRIGHT and DOUGLAS.—"On the Action exerted upon the Tubercle Bacillus by Human Blood Fluids and on the Elaboration of Protective Elements in the Human Organism in response to Inoculations of a Tubercle Vaccine." ('Proc. Roy. Soc.,' vol. lxxiv, 1904.)

ON
RIDER'S SPRAIN IN WOMEN
(INJURY TO THE HAM-STRING MUSCLES),
WITH SPECIAL REFERENCE TO CERTAIN
CASES OF SUPPOSED SCIATICA.

By Sir WILLIAM BENNETT, K.C.V.O., F.R.C.S.

FAMILIAR as all practitioners are with rider's sprain in men, the fact of its occurrence in women, who use the side-saddle, seems either to have been overlooked or to have been thought of too little importance to be worthy of record. That a condition occurs in women which may fairly be called rider's sprain there is no room for doubt; and it is equally sure that the symptoms arising from it are not always rightly interpreted, but are ascribed to other causes, sometimes with unhappy results. In men and those who ride astride rider's sprain may be understood to mean a sprain or rupture of the sheath or some fibres of the adductor muscles, mainly the adductor longus at its origin. In those who use the side saddle rider's sprain may be defined as a sprain, tear, or bruise of the sheath or some fibres of the hamstring muscles below their origin from the tuber ischii. The symptoms of rider's sprain in men are too well known to justify their repetition here, but it may not be amiss to emphasize the fact that the most persistent of them are wasting of the adductors and (consequent) loss of "grip." The symptoms altogether are very precise, and can hardly be confused with those caused by any other lesion.

In women, who use the side-saddle, the symptoms are also precise, but they at times so closely resemble those produced by another condition as to lead to errors in diagnosis; hence in some respects they are of more importance than in men. As is the case with men, the trouble is more prone to occur in persons who are indifferent riders, or who have not ridden for some time, although it is by no means confined to such. The sequence of events is generally as follows: During a jump, sudden swerve, or some eccentric movement of a restive or "difficult" horse, a pain, which need not be severe, is felt at the back of the right thigh, which with some riders bears very heavily on the pommel in ordinary riding, and especially so if difficulties arise. No importance is probably attached to the pain at the moment, but upon rising from bed on the following morning there is great stiffness of the limb concerned, and on walking, or attempting to walk, acute pain is felt at every movement, particularly extension, which, beginning apparently just below the buttock, runs down the back of the thigh along the outer side of the knee into the upper part of the calf, thus resembling to a certain extent the symptoms of

another condition for which they are sometimes mistaken, viz. sciatica.

The pain and stiffness persists and soon wasting of the hamstring muscles follows. There is tenderness below the tuber ischii, which extends downwards. Allowing for difference of locality, the sequence of events is, *pari passu*, the same as occurs in rider's sprain in men. The importance of the condition in women, which I have not seen previously described, rests on its liability to be mistaken for sciatica. Yet if the fact that such an injury occurs is realised it is difficult to see how the mistake can arise. In sciatica the pain passes down the middle of the back of the thigh through the popliteal space into the calf; the tenderness follows closely the course of the sciatic nerve, commencing above at the buttock in the line of a point midway between the tuber ischii and the great trochanter of the femur. In the rider's sprain of users of the side-saddle the pain has a somewhat similar distribution above, but below follows the line of the hamstring muscles, more especially the biceps. It is absent from the centre of the popliteal space, and is increased by any action of the hamstrings. The tenderness above is limited to the outer margin of the hamstrings, and is not produced in the sciatic nerve by pressure. Below it diverges further from the middle line, following again the course of the muscles and leaving that of the nerve free. The mistakes in diagnosis can, I think, be due only to one of two causes: (1) imperfect examination, and (2) the absence of general recognition of the occurrence of this injury to the hamstrings. Amongst the cases of mistaken diagnosis in this affection which have come under my notice in the last three years, there were two very striking and instructive ones. In both nerve-stretching had been recommended for "sciatica," in one of the cases by two surgeons of repute, although on careful investigation it was obvious that the pain and tenderness was not connected with the nerve. In the other case an exploratory operation upon the point of greatest tenderness showed the scar of an old laceration in the long head of the bicep, about four inches below the origin. The mechanism of the injury requires no explanation to those familiar with the position of the limbs in riding on a side-saddle, and is easily seen by a reference to the accompanying diagram, which shows the relation of the parts concerned to the pommel. Under the circumstances of strain mentioned, it is clear that the hamstrings of the right thigh may readily be torn or bruised by sudden concussion or strain, especially if the saddle does not accurately fit the rider—a very important point to which sufficient attention is not always given even by experienced persons. In fact, the causes of this injury are mainly those mentioned by an ancient writer, who ascribes an injury of a somewhat similar kind to riding upon

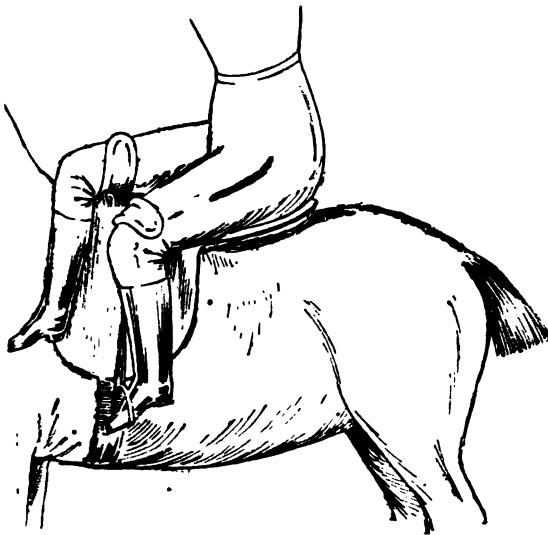
“ . . . an evil horse
In a naughtie saddle.” *

Add to these an indifferent rider, or one who is out of condition, and the causes become complete.

Apart from special cases of the kind I have been considering, there is good reason for believing that symptoms resulting from bruise or sprain of the hamstring muscles are more frequently confused with those arising from sciatica than is commonly supposed.

The following cases are striking examples :

1. A lady, æt. about 30 years, whilst playing golf, fell backwards into a thick bush, striking the left thigh rather heavily against a stump. There was some discomfort at the time, but she continued playing until the pain at the back of the thigh became too great. The following day there was great stiffness and tenderness, which passed off



after a week's rest, when she began to resume her ordinary life, which was a very active one. The pain and feeling of discomfort never entirely left her, although it was said to have been very trivial for a month or six weeks, at the end of which it became more acute, preventing her taking more than a very little exercise. There was persistent tenderness about the middle of the back of the thigh, which caused her to sit down with much care and to rise with difficulty. For eighteen months she was treated for sciatica, medicinally and by local means. None of these measures, which included a visit to a continental watering-place and an English health resort, had any effect upon the symptoms. She was practically a cripple, who had to lead a half-invalid life. At the end of this time I saw her, the main complaint being persistent pain and tenderness at the back of the thigh, the latter passing down to the knee and outer side

of the calf. On examination, the thigh was wasted, especially over the hamstring region, flexion was painful, as was also passive extension beyond a very moderate degree. The pain seemed to start below the buttock, passing down the back of the thigh along the outer side of the knee to the upper part of the leg. The tenderness was very distinct at the middle of the thigh to *the outer side of the middle line* over the biceps. The sciatic nerve could be pressed upon as heavily as possible above and below without causing any pain. The line of tenderness was, in fact, outside the line of the nerve. It was stated that she had been examined carefully by more than one practitioner, a diagnosis of sciatica on each occasion being made. As the case was so far as I could judge certainly not one of sciatica, and as all previous treatments seemed to have failed to give any relief whatever, I cut down upon the point of greatest tenderness, and found the parts a good deal matted to a fibrous puckering in the muscle clearly caused by an old laceration. The sciatic nerve was quite free and remote from the lesion. The sequel showed that the symptoms were entirely caused by the damage which was discovered at the operation.

2. A man, approaching 40 years of age, had a fall from his horse whilst hunting. He was a good deal shaken at the time, but noticed nothing particularly wrong until the following day, when on attempting to leave his bed his right thigh was so stiff and painful that he was glad to lie down again immediately. Some swelling and bruising followed, but after ten days of partial rest he was well enough to ride again, but with great discomfort. He persevered, however, and hunted until he began to lose his "grip." He consulted several authorities here and abroad (he habitually spent half the year away from this country) and was told by all that the pain from which he suffered was due to sciatica caused by the injury and subsequent exposure to wet. Nerve-stretching was therefore adopted in another country, but without effect, excepting the production of rather extensive numbness over the anterior and external aspect of the leg, which after persisting for a month or two gradually disappeared, leaving the sensation in that region normal. The pain in the thigh remained unchanged. I saw the patient about sixteen months after the injury, and from the description of his symptoms the case certainly was very strongly suggestive of sciatica. On examination, however, the pain did not seem to follow the proper line for sciatica, and there was certainly no tenderness of the nerve. Hyper-extension was very painful, but more especially over a localised spot towards the inner side of the thigh and away from the sciatic nerve. The spot was acutely tender, and if whilst sitting down it chanced to come in contact with the edge of the chair the patient sprang up with a good deal of agility. The operation scar was healthy and perfectly

* 'The Breviarie of Health,' by Andrew Boord, Doctor of Physicke, 1598.

free, without tenderness or hyper-sensitiveness of any kind. Careful examination of the tender spot revealed what seemed to me to be a swelling situated apparently deep in the muscles. This was subsequently explored and a cyst containing altered blood was found in the substance of the inner portion of the hamstring mass, evidently an old hæmaturia originating at the time of the accident. Complete relief to all symptoms followed the clearing out of this old blood cyst, although of course some time elapsed before the full power of the limb was regained.

As in the other cases, I do not think it possible that any misapprehension as to the nature of these cases could have arisen if the liability of the hamstring to injuries of the kind referred to in this lecture were generally recognised.

With regard to the treatment of these injuries the indications are the same as hold good in rider's sprain in men and other sprains and contusions, the main points being the prevention (1) of muscle waste, and (2) of matting together of the parts; a short period of complete rest immediately after the accident or injury, to allow of the cessation of hæmorrhage into the parts when these are lacerated, and the subsidence of the tenderness and pain sufficiently to enable the patient to tolerate the massage and exercises, passive at first but after a few days resistant, by which alone a satisfactory cure can be effected. It cannot be too frequently emphasized that rest, except for the purposes stated, is not the proper treatment for cases of this kind, excepting under very special and peculiar circumstances. Intelligently applied, electricity is a great aid in the avoidance of waste, but its application should be deferred until after all activity about the seat of the lesion has subsided. At the same time, it should be borne in mind that from the nature of things the wasting and slight loss of muscle power in cases of rider's sprain in women who use the side-saddle is not of the same importance in relation to riding as is the loss of "grip" in men, so that riding can generally be resumed *with comfort* more quickly by women than by men. It is, however, most essential that the pommel should be well padded and made to accurately fit the thigh. In all the pronounced cases which I have seen three months has been about the period which has elapsed before a complete cure has been effected—by which I mean absence of pain, tenderness and wasting—when treatment has been at once undertaken on rational lines. In neglected cases the time may be indefinite and in some permanent lameness caused by what is sometimes incorrectly called sciatica may ensue. So far as I know injuries of the hamstring muscle as a specific lesion arising in the way I have described have not been hitherto described, although it seems to me that from a practical point of view they are not altogether without importance.

THE SUFFICIENT TREATMENT OF INSANITY.

Dr. T. CLAYE SHAW.

"THE sufficient treatment of insanity is a very expensive affair, whether at home or away, and it must be said that in only a few institutions do the conditions for complete treatment exist. In the very large asylums the personal attention of the senior physician and director may be said to be merely nominal as far as medical treatment goes, and the patient is left largely to the care and supervision of assistants who may or may not be adequate. The smaller county asylums are, as the reports of the Commissioners show, very imperfectly equipped with scientific means for research and treatment, and it is practically in only the very small houses of isolation that the requisite individualisation can be given; and of course, in proportion as the numbers are small, the expense of care and treatment will be higher. The well-to-do private patient is the one who has the best chance of being successfully treated."

The above is taken from Dr. Shaw's interesting volume of 'Ex Cathedrâ Essays on Insanity,' published (5/-) by Adlard & Son, Bartholomew Close. Medical practitioners will find in this volume a great deal that will not only interest but also instruct them, and the intrinsic merit of the work will insure its success.

SYPHILIS, OR NOT SYPHILIS?

Mr. G. PERNET.

"SYPHILIS, or not syphilis? That is the question which is constantly cropping up in practice, whatever the line of work. This is especially the case where sores and rashes of the skin are concerned, and it is here that mistakes are likely to be made. It is scarcely necessary to enlarge on the importance of accurate diagnosis from the point of view of prognosis, treatment, and prophylaxis. It is quite true that the differential diagnosis of syphilitic and non-syphilitic affections of the skin may be very difficult, as in the case of anomalous or ill-marked eruptions for instance. . . . Prophylaxis, again, is of vital moment in syphilis, for it behoves the medical man to do what he can to prevent its spread. This may be a delicate matter in some cases."

No one who reads the foregoing passage can fail to appreciate how justly Mr. Pernet, in his book, published (6/6) by Adlard & Son, of Bartholomew Close, on 'The Differential Diagnosis of Syphilitic and Non-syphilitic Affections of the Skin,' estimates the importance of the task he has set before him. The author modestly hopes that his teaching will prove acceptable and useful to practitioners and students, for whom it is intended; and to these we may confidently add the specialist, for the publication is one that will commend itself to all branches of the medical profession.

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* Specially reported for the Clinical Journal. Revised by the Author.

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ON ONE HUNDRED AND TWENTY-FIVE OPERATIONS ON CASES OF APPENDICITIS.

A Clinical Lecture delivered at St. George's Hospital
October 11th, 1904.

By G. R. TURNER, F.R.C.S.,
Surgeon to the Hospital.

GENTLEMEN,—The subject that I am going to bring before you this afternoon is one that I have spoken of before now to you, namely, appendicitis. But I have not hitherto collected all the cases that I have operated on during the last ten years (from 1895 to 1904) at the hospital; and I have to express to Mr. English my thanks for having, at great trouble to himself, put together the notes of these cases of mine from which I have made the analysis that is before you. I may incidentally mention other cases that I have had in private, but purposely I shall speak of the hospital cases rather than lump together the hospital and private ones, and for this reason: that the hospital cases, of necessity, are usually very much more severe than the cases which you meet with in private, and you students can refer to all and may have seen many of them. In private cases one more often has to operate, where operation is necessary, between the attacks. Educated well-to-do people are carefully looked after in slight attacks, and many of them, therefore, recover without any operation at all.

Speaking particularly this afternoon about those cases that I have had to do with at St. George's Hospital during the last ten years, the first thing I want to say is that I followed, almost of necessity, the hospital classification, which includes the acute cases, the acute cases with abscess, the subacute cases, and the chronic cases. The acute cases and the acute cases with abscess speak for themselves. The subacute cases may be taken to mean those cases which, although more or less acute, are not operated on until at least twenty-four hours after admission. Such a case comes in just

after the attack has begun, and the patient stays in the hospital for two or three days before he is operated on; such a case would come under the heading of subacute, although often really clinically acute.

Of the 125 cases, 47 had had well-marked previous attacks; 88 were acute or acute with abscess—ten of whom died (one from chloroform); 23 were subacute—all recovered; 14 were chronic—all recovered. The appendix was removed in 103 out of 125 cases operated on.

Of the 88 acute cases, 22 had had well-marked previous attacks.

In 30 out of the 65 cases in which it was removed, the appendix was gangrenous.

Stercoliths are noted in 34 cases.

The acute cases with abscess were 51 in number, 6 of whom died; 12 had had previous attacks. The appendix was removed in 20 of these cases; it was not seen in 22 (of these 22 all recovered except one who was admitted moribund); 2 had had subsequent trouble demanding operation.

The acute cases without abscess were 37 in number—4 of whom died. In 7 cases acute general septic peritonitis was present at time of operation. In 10 cases there was recent perforation; 8 had had well-marked previous attacks. In all these cases the appendix was removed.

Of the 23 subacute cases 9 had had well-marked previous attacks, 5 were complicated with peritoneal tubercle. All recovered.

Of the 14 chronic cases all had had several previous attacks, one no less than 13, others 6 and 4. In one case there was evidence of an old healed perforation. In one during convalescence there was thrombosis of the left femoral vein. All recovered.

Age and Sex.

Males, 76; females, 49; 23 children (under 16). Adults, 102.

Only 7 over 40. Greatest age, 2 cases *æt.* 56 years.

Adults, 102—24 over 30; 78 between the age of 16 and 30.

Mortality.

Acute cases . . .	11.3 per cent.
Acute and subacute cases . . .	9 „
Subacute cases . . .	Nil.
Chronic cases . . .	Nil.

125 cases, mortality 8 per cent.

Of the 10 fatal cases, in 6 abscess was present, in all the appendix was gangrenous, all were acute cases. One died from chloroform; 2 were admitted moribund; 1 was complicated by abortion at the sixth month; 4 had general septic peritonitis present at the time of operation; 1 died on the nineteenth day from sloughing of cæcum—no peritonitis; 1 developed peritonitis on the fourth day from premature removal of gauze packing. In 7 of the cases the fatal was the first attack, in 1 the second, in 1 the third.

Complications.

Five cases . . .	Tubercular peritonitis.
One case . . .	Perforated duodenal ulcer.
One case . . .	Perforated gastric ulcer.
One case . . .	Acute rheumatism.
One case . . .	Pneumonia after operation.
One case . . .	Thrombosis of femoral vein after operation.
One case . . .	Pulmonary embolism after operation.
One case . . .	Acute mania after operation.
All of these recovered.	

Deaths.

1. Acute. General septic peritonitis present at operation; died fifth day.
2. Acute. Acute general peritonitis; died ninth day.
3. Acute. General septic peritonitis present at operation. Abortion six months' foetus; died sixth day.
4. Acute with abscess. Appendix not seen. General peritonitis; died fifth day.
5. Acute with abscess. Sloughing extended into cæcum; died of exhaustion, no peritonitis, nineteenth day.
6. Acute with abscess. Perforation; died, of general peritonitis, fourth day.
7. Acute with abscess. Gauze packing removed on the fourth day, peritonitis then rapidly followed; died on seventh day.
8. Acute with abscess. The abscess apparently had burst on his admission. He died with all symptoms of chloroform poisoning at time of operation, on the operating-table.
9. Acute with abscess. General septic peritonitis, practically moribund on admission; died in twenty-four hours.

10. Acute. General septic peritonitis, pus everywhere, practically moribund on admission; died in four hours.

In all these cases the appendix was partly or entirely gangrenous.

A much better classification, to my thinking, is the classification that Mr. Gilbert Barling has made. He describes—I am giving you his experience at the Birmingham Hospital—the results of operations on 143 acute cases of appendicitis. He divides them as follows: (1) Cases in which there was diffuse peritonitis; of these there were 29, with 14 deaths, a mortality of nearly 50 per cent. and naturally, included in them were what are called fulminating cases of peritonitis. (2) Cases in which there was pelvic and adjacent peritonitis with suppuration; there were 34 such cases, with 7 deaths. (3) Those cases in which there was localised non-adherent abscess; he had 49 of these, with 2 deaths. (4) Those cases in which there was localised adherent abscess; these cases numbered 31, with two deaths. This is a far better classification, for purposes of examination of cases of appendicitis, than the one that we use here. Ours is convenient, but it does not divide the cases up into the varying conditions as Mr. Barling's classification does. For instance, I have before now spoken to you about abscess in connection with appendicitis, and have pointed out a great distinction that stands between an abscess adherent, more or less, to the front abdominal wall, and one that is non-adherent and situated perhaps at the back of the pelvis. Therefore, in classifying these cases of appendicitis, Mr. Barling does what I should like to see done here.

I have, naturally, followed the classification of our Registrar, which classification is now many years old, in presenting to you the statistics of these 125 cases. Are statistics any good? It has been said that "statistics can prove anything," and they *can*; and they may also prove nothing. But I think statistics possibly may do good, in this direction at any rate: If an operator who, we will say, waits during an acute case until he is driven to operation gives his statistics, and then if another operator who operates on all acute cases as soon as he can, gives his statistics, in that way we may get some little benefit from them. I may say that I stand before you rather as an operator of the latter class. Of course, if, when one sees a case

of appendicitis, the conditions are ordinary and it is obvious that the patient is improving, then, in that case we are practically all agreed that it would be better to operate in the quiescent period. But if there is going to be any doubt as to what the exact condition of the patient is, or whether he is likely or not to get better, then, I maintain and hold very strongly that the safest thing to do is to operate. The line I have taken during these ten years in operating on these cases (that is, the acute cases) is that they have been operated on as soon as possible after their admission. They often come up to the hospital after many days' illness; they may have a large abscess when they come—large abscesses do not form in a day—or other complications may have resulted; but whatever their condition, unless one of obvious convalescence, if the case is undoubtedly one of acute appendicitis, I believe it is safer for the patient to be operated on at once than for the surgeon to wait until, later on, he is driven to operate, always supposing that the surgeon is one practised and familiar with these operations.

Now, if this line of treatment is persistently carried out, the surgeon may ask himself, sooner or later after operating: "Do I regret having operated on this case?" I can say conscientiously that in these 125 cases I do not regret having operated on one of them. I have seen cases years ago, especially in the early days of the recognition of appendicitis, where surgeons have admitted that they regretted *not* having operated. I think a great many surgeons would tell you, if they gave you their entire confidence, that what they regretted, if they regretted anything about appendicitis, was that they had put off operating rather than that they had operated too early.

The dangers of operating during the acute stage of appendicitis are put down as follows: It is contended that there is greater risk of sepsis if operation is performed during this period; that the abdominal walls may be weakened by such an operation; that there may be fæcal fistula or some other similar complication, because in the acute stage you cannot always deal with the appendix in the way that you usually do when you operate in the chronic stage by turning back a flap of the peritoneum and making a neat little stump. If you operate during the acute stage, you will more often have to use drainage, and if you use a drain there

is the theoretical objection that you may leave, after convalescence, a more or less weak abdominal wall. As a matter of fact, I do not believe you do leave a really weak abdominal wall. There may be in some few cases a suggestion of ventral hernia, but if you have operated during the acute stage, when the patient's life has been in real danger, then, even supposing that there is some little yielding—though personally I have not seen much of it—you have, after all, done the patient no injury, but rather the reverse. You must remember that these cases that require drainage usually in any case, whether you wait or not, come to operation.

In regard to the increased danger of sepsis, I take it that there will only be that danger if you operate during an acute attack—when you have got a really serious condition about the appendix, such as suppuration, or gangrene, commencing or accomplished; but surely your patient's safety will be better consulted by the removal, as soon as possible, of this dangerous condition.

The mortality following operation in the acute stage has been put down by Sir Frederick Treves, in his Cavendish Lecture of 1902, at 20 per cent. That is a very large percentage, because, as you will remember, if you take the mortality of cases operated on in the quiescent period between the attacks, it is very much less than that. Amongst the cases that I am bringing before you this afternoon—the chronic cases—there was no death at all. I have never had a death in the cases that I have operated on between the attacks. More than that, I can say that there never has been a death in this hospital when a chronic case has been operated upon. There was one case—it was not under my own care—where the appendix was operated on during the chronic stage, and the operation was eventually followed by death from cerebral abscess, or something like that. That is the only case at all of death that has occurred here after a large number of operations on chronic cases, and that was due to no abdominal condition. I think most surgeons will tell you that the mortality in chronic cases is very small—almost nothing—and if we could be sure that acute would always develop into chronic no one would operate during the acute stage; but this is just the thing we cannot be sure about. That the mortality may be 20 per cent. in acute cases is, I daresay, perfectly true. It is not always so, however, in the experience of

different operators. It has not been so in mine. The mortality in Mr. Barling's cases, as published, is 17·5 per cent. But Mr. Barling very rightly observes that this mortality must not be regarded as the mortality due to the operation. People do not die because of the operation; they die because of the condition which is inside them and which has led to the operation. That is how you must look upon the mortality when the case is acute and when the local condition is such that, if it be not relieved, death must follow. The mortality means simply and solely that you have failed to save the lives of a certain percentage of cases. In these cases that we are specially considering to-day, those of you who have a copy of the synopsis will see that there were 88 acute cases, with a mortality of 11·3 per cent. If to the acute cases you add the subacute—and you will see that by our classification here one might very well do that, because these latter are really acute cases, but they are acute cases that are watched for a day or two—then the mortality comes out at 9·001, or only about 9 per cent. In the subacute and chronic cases there was absolutely no mortality. Taking the mortality in the acute cases at its worst, 11·3 per cent. in those 88 cases, that mortality, as you see, is very much below 20 per cent. And when I tell you that it includes a death from chloroform, and a case followed by abortion in the sixth month of pregnancy, and two cases sent up here absolutely moribund, and four others where there was obviously general septic peritonitis at the time of the operation, it leaves the cases of death where there was a chance of recovery as very few. I take it if you have acute general septic peritonitis it depends on how far the toxæmia has advanced as to whether it is possible to save such a case. The death from chloroform—a most terrible catastrophe, which was, no doubt, unavoidable—while it helps to swell the mortality, really ought to be deducted from the list. I shall say more of that case later on when analysing the cases that have proved fatal. In those cases where, roughly, I have gone on the principle of always operating during an acute attack, the great probability is that nearly every one of them would have died had they not been operated on. I may say that in every single one of the fatal cases the appendix was gangrenous; and if you have a gangrenous appendix, it is not very likely that the patient is going to get well

without operation. Such a thing is possible, no doubt. For instance, you may have a gangrenous appendix and an abscess which may burst into the intestines, or even externally, and the patient may, in this way, be cured. But, at the same time, these are conditions which will lead any surgeon, even of the expectant school, to recognise the necessity of operating. The only mortality I have had has been in those cases where there could have been no question of the urgency of an attempt being made by operation to save life.

There is a school of surgeons who only operate on acute cases when driven to it: that is to say, they put off the evil day as long as they can. Some published statistics show a mortality of 30·7 per cent. in cases in which after delay operation was eventually performed. That is a very large proportion of deaths. I am not at all sure whether the statistics prove anything or not, but that is a remarkable percentage. It is very difficult, of course, really to argue by statistics, especially in cases of appendicitis, which are all lumped together. For example, this year, at St. George's, Mr. English tells me we have had 125 cases, and of these 18 have died. That gives a percentage mortality of 13·6. I had the curiosity to look out these 125 cases, in order to ascertain how many of them were chronic cases, and I found that 20 of them were chronic cases, and the whole of those 20 recovered. That leaves 105 cases with 18 deaths, representing a mortality, in those acute and sub-acute cases, of about 17 per cent. during the past year.

There is one other argument that I should like to bring before you in favour of operating in acute cases, unless it is obvious that they are getting well—the exceeding difficulty that there is in really making a diagnosis as to what is going on in the neighbourhood of the appendix. It is all very well to say that the appendix is gangrenous, or there is an abscess present, or it is in this or that condition; but you cannot be absolutely sure about any of these things. It is said by some people that when gangrene occurs in appendicitis there is cessation of pain. You may remember that when gangrene occurs as the result of unrelieved strangulated hernia, the pain very often ceases, and it is said that the same thing takes place in appendicitis. But you do not want to wait until the unfortunate patient has no pain,

and then diagnose gangrene and operate. It is very difficult often to diagnose suppuration. If you have got a typical case, it is easy enough. Perhaps the patient may have a shivering fit some little time after the first onset of the attack, and the temperature runs up, and there are febrile symptoms, there is a lump in the iliac region, and you naturally conclude that there is suppuration and you cut down and find it. Such cases may be easy enough to diagnose. But it is often very difficult to be certain of the exact condition of things about the appendix. Some years ago I remember having three cases of appendicitis to operate on in one day, and I operated upon them in the order of their apparent severity. I left to the last a patient who, it turned out, had got perforation and gangrene, because he seemed to me to be the least severe case of the three. No doubt I saw him in what is called the “period of repose.”

That brought home to me how very difficult it is to make a correct differential diagnosis. If you read the writings of those who say you must hold your hand until such time as there are symptoms indicating perforation, suppuration, or gangrene, and that then you are to operate, I think you may become rather confused, and I can quite conceive that the mortality will be higher than 20 per cent. I confess I am a little confused when I read about these indications, because there may be no obvious temperature in suppuration, and hardly any rapidity of pulse. We all know that a rapid pulse, not, perhaps, corresponding with any high temperature, is a very reliable sign that there is mischief and perhaps that operation is advisable. We know also that vomiting, independently of food, is another sign that should guide us to a correct conclusion as to whether we should operate or not. We may also be led to operate in consequence of the presence of a tumour, but tumours are sometimes purely muscular, and if the suppuration is post-cæcal or pelvic it may be extensive and still without tumour. Rectal or vaginal examination may help us here. There are various other things mentioned to guide us, *e.g.* leucocytosis—whether we should hold our hand or not with regard to operation—and the practice, both of physicians and surgeons, widely differs on what constitutes necessity for surgical interference.

As far as I am concerned, I ask myself, when I

see a case: "Is it safe to leave this patient without operation?" And if he has abdominal pain, rigidity, and tenderness about the iliac fossa, a rapid pulse, and especially if vomiting is present, I usually decide to operate, and to operate at once. I may say that I have never regretted this course of action. I have always, when I have operated, found the appendix diseased, not only in cases that I myself have diagnosed, but in cases diagnosed by others. I must qualify that statement, because on two occasions I have opened the abdomen thinking that I was going to deal with a perforated appendix, and found, instead, that I had to deal in one case with a perforated gastric ulcer and in the other with a perforated duodenal ulcer. In both these cases, however, the appendix contained a stercolith, and in both I removed it and sutured the perforated ulcer. Both cases, I am glad to say, recovered. I allow, therefore, that these two mistakes in exact diagnosis have been made. The element of time too comes in. By early operation your patient is spared a convalescence and then, perhaps, a waiting for the eventual inevitable operation weeks or months afterwards. If something inside the abdomen gives way—the stomach, the duodenum, the Fallopian tube, or the appendix—the diagnosis may be difficult. As I have said, you cannot be *sure* what the condition may be inside the belly. Therefore, in a case where you feel pretty certain of the fact that there is appendicitis, even though the attack is acute, I think it is right, unless the case is obviously getting well, to operate rather than to wait.

There are other symptoms of appendicitis, that I need not give you in detail; I have no doubt that you know them well. Some people regard the results of percussion as important, and percussion, so long as the patient is kept quiet, is undoubtedly of help. I do not believe in percussion if you have to move the patient about, and cases are on record where abscesses have been burst by the manipulation of the medical man. A patient with appendicitis, and who, perhaps, has an abscess surrounded with a mass of intestine, is a dangerous subject to percuss or handle over much.

Respiration is one of the things you have been told to look to, and, of course, the more costal the type the more likely it is that the abdomen is affected. The other symptoms I have already touched upon, excepting the condition of the

bowels. In a case of appendicitis the bowels, as a rule, you will find constipated. In some cases diarrhoea is met with, but I think I am right in saying they are uncommon. Diarrhoea is regarded, in one way, as a good symptom, because it shows that the intestines are still capable of passing on their contents. It is also regarded as a bad symptom, because very often it is present in those cases where there is acute toxæmia, acute blood-poisoning.

As I have just indicated, constipation is very common in cases of appendicitis, and that leads us to the treatment of this condition. It is constantly treated during, or immediately before, the attack by purgatives. Anyone who has seen a number of cases must, I think, have come across some where purgation has been the reverse of beneficial. I am quite certain I have seen one case in private where the appendix was ruptured as the direct result of purgation immediately before the operation. In this case a purgative had been given by the nurse without any medical order, and when I came to operate on the patient—a boy—I found that the appendix abscess had just burst, and I believe that was the direct result of purgation. This patient happily recovered. I would therefore say avoid purgatives in treating cases of appendicitis. Some authorities say that saline purgatives, such as sulphate of magnesia, should be given; others hold with the views that I have expressed. The purgatives are of use, no doubt, if, *after an operation*, there should develop symptoms of stagnation of the bowel contents, flatulence, and other signs of possible incipient peritonitis. As you know, it is now the fashion under such conditions to rely on purgatives, and there is no doubt that carbonate of magnesia, sulphate of magnesia, and such saline purgatives, given every four hours, if the bowels can be got to act, almost at once give relief. But in the preliminary pre-operative stages I should like to enter my protest against purgatives.

With regard to the details of the operation, we come, first of all, to the incision. I daresay you have seen the incision made by which any division of the muscles of the abdomen is avoided; and that, no doubt, for simple, quiet, ordinary cases, operated on between the attacks, is a good method, but good, I humbly submit, only for those cases. This gridiron method of incision, as it is called,

where you separate the fibres of the internal oblique, and the transversalis, without dividing any of the muscular fibres, undoubtedly gives very little room. If it is a case where you can pull out the cæcum and deal with the appendix without great trouble, it is a very good incision. But if you are dealing with a case of urgency and gravity, you want, in getting down on the appendix, to see what you are doing and what it is adherent to, and, if it be adherent, whether you can safely separate the adhesion. If you have only got a small incision, you may rupture a distended appendix in separating it from some structure to which it is adherent. On these grounds in all acute cases I never should adopt this gridiron incision. I think it is very well and proper for chronic cases likely to be exceedingly simple, but not for others. It is an advantage, of course, that, the muscles being less interfered with, the patient perhaps has not to wear an abdominal belt, and the convalescence is a rapid one.

Personally, I make an incision outside the rectus muscle if there is no lump. On the other hand, if there is any lump or swelling, I make the incision over that lump or swelling. I should like to give you one caution, and that is, if ever you operate on a case of appendicitis where there is a lump or swelling, see that you make your incision over that lump or swelling; and see, if you are going to open an abscess, that you do not accidentally extend your incision from the abscess cavity into the uncontaminated peritoneum beyond. I have seen a case where an incision was made into the abscess cavity and into the *virgin* peritoneum, if I may so call it, beyond, in which the septic pus entering the peritoneal cavity caused a fatal result.

Having made your incision and opened the abdomen, you have to deal with the appendix according as you find it. If there is an adherent abscess, what Mr. Barling calls a *safe* abscess—an abscess, that is to say, where coils of intestine are adherent to the front of the abdomen—the opening of the abscess is perhaps all that is necessary. Then comes the question as to whether, the abscess being opened, it is advisable or not to remove the appendix. I have been guided in this by whether or not I have seen the appendix. If I see the appendix when I open the abscess, and it is obvious that I can get it out without unduly dis-

turbing the safety-giving adhesions, I remove it. You will see that in these acute cases with abscess the appendix was removed in 29 out of 51 cases. In the other 22 cases I did not remove the appendix. Some surgeons believe that the appendix ought to be removed in all these cases of abscess, and that, if it is not removed, there is a great liability to recurrent attacks. There is something in this, I allow, but I hold that it is safer to open the abscess and drain it, and not to remove the appendix unless you see or can feel that it is easily removable. On a subsequent occasion, or if there should be a second attack, you can take the appendix out, wherever it may be. Of the 22 cases in which I did not remove the appendix, I think I am right in telling you that in two of them there was subsequent trouble. One was a young woman who came back about a year afterwards with another abscess as before, and then I removed her appendix. Judging from what people have written on this subject in medical journals and elsewhere, I think the evidence goes to show that subsequent trouble, if the appendix be not removed, is very much the exception rather than the rule. In my own cases, as I have said, only 2 out of 22, or about one-tenth of the cases, have had any subsequent trouble. When there is an abscess, very often the appendix is destroyed, and if there is no stercolith, in all probability the appendix will not give you any trouble. But if the appendix has a stercolith in it, and this is not removed, it is quite possible that it may give rise to trouble afterwards. I had one case in which, about a year afterwards, a second little abscess formed and the stercolith came out. I was not able to get at it during the original operation. Personally, then, I do not remove the appendix unless I see it, or feel that I can remove it safely.

Let us suppose you have got an abscess that is not adherent—adopting Mr. Barling's classification—an abscess that is not superficial. You have to make your way through healthy coils of intestine and the peritoneum in order to reach the abscess. These are nasty cases, because you have to deal with deeply-seated foul septic pus, and to see that the peritoneum is not contaminated at or after the operation. It may frequently happen that when you open the peritoneum you will see pus, but pus which is quite different from the septic pus that is round, perhaps, a gangrenous appendix. In

these cases pack the parts all round with sponges or gauze. Personally, I prefer sponges for packing purposes at the time of the operation. Then very carefully open the abscess and mop up with stick sponges every little bit of pus as fast as it comes out. Make a small opening into the abscess with your finger and see that you are not deluged by any sudden discharge of pus. Have relays of sponges, and sponges on clips, so as to be able to mop up the pus as it comes out. When the abscess is thus thoroughly evacuated, you can remove the packing sponges and substitute gauze, and putting in a large drainage-tube, prevent anything like contamination of the peritoneum and consequent septicæmia. I use drainage in all abscesses, and have no experience of completely stitching up such cases, but I have heard that when this has been done it is not uncommon to have to remove the stitches to let out retained pus.

We will now suppose that there is no abscess, but the appendix is acutely inflamed, with perhaps a stercolith in it. In such a case the stercolith can occasionally be pushed back into the cæcum—I have only been able to do this once—or the stercolith may be removed with the appendix. If you can do it, a flap of peritoneum should be made, and a formal amputation performed. In some cases, where the appendix was very adherent or very deeply seated, I have found that first of all dealing with the cæcal end has facilitated removal. It may not be necessary to use drainage. If, however, the appendix should be gangrenous or the seat of suppuration, then, after removing it as best you may, a drain should be used. I should like to say something about the gauze used for this drainage. In my judgment that gauze should be removed very carefully, and not too soon. My practice is to leave it almost alone for, perhaps, two days, and then to remove some three or four inches of it, and gradually take it away, so that the last of it comes away about the fifth or sixth day. You should never take it away suddenly, not even the last bit. I regret to say that in one of my fatal cases the cause of death was undoubtedly due to the gauze being removed all at once by my house-surgeon, on the fourth day. That was a case where the appendix was gangrenous and where there was an abscess—the case of a boy. Up to the fourth day he did perfectly well: there was not a sign of acute general peritonitis, and, in

fact, I regarded him as virtually “out of the wood.” But when I saw him on the fifth day he had developed acute general peritonitis, and it was quite evident to us that this had resulted from the pulling out of the gauze too suddenly. He died on the seventh day, and this was a painful lesson to me of the necessity of leaving the gauze, in cases of abscess or gangrene, until there is absolute certainty there can be no contamination of the general peritoneum by removal.

In reference to the stitching up of the abdominal wall, my practice is simply to stitch up all the layers with silkworm gut and disinfect, as far as possible, the parts contaminated. If the case should be a dirty one, the parts should be peppered with a powder, such as aristol, about the stitches, in order, as far as possible, to prevent stitch suppuration. In spite of the fact that many of these cases on which I have operated have been exceedingly foetid, very few of the wounds have been actually inflamed, although the dirty septic matter must, from the nature of the case, have been touching them at the time of the operation.

With regard to complications, if you look at the analysis you will see that the complications in connection with these 125 cases are exceedingly few. One was a case of acute hæmorrhage into the cavity of the appendix. It was full of blood, and the walls also were infiltrated. I am doubtful as to whether I am right in calling it appendicitis at all; the condition may have been such a condition as Henoch's purpura. There was, however, no sign of purpura elsewhere. It was a case having all the symptoms of acute appendicitis—sudden onset, vomiting, tenderness, rigidity, pain, rapid pulse, elevated temperature. There were five cases complicated with tubercular peritonitis. There was one case of perforated duodenal ulcer and another of gastric ulcer, and in each of these cases there happened to be a stercolith in the appendix. One case was complicated by acute rheumatism. After the operation there was one case of pneumonia and one of thrombosis of the femoral vein. Thrombosis of the vein after, or accompanying, appendicitis has been pointed out by various authors as not at all uncommon. I have had but one case; I believe I should have had more such cases if I had waited longer before operating. I remember a gentleman on whom I operated in private, whose operation was delayed a long time because of the thrombosis of the vein following the attack of appendicitis. I know of other cases of the kind, but, as I have said, I have had only one case complicated with thrombosis in all these 125 cases. The thrombosis, curiously enough, is usually on the left side; thrombosis or embolism may arise after any operation and is not peculiar to appendicitis. Another case was complicated with acute mania following the operation. This woman eventually recovered.

There are other complications sometimes, but they do not happen to be given in the analysis of my St. George's cases. I had one case, in private, where there was a complication of liver abscess, following suppuration about the appendix. This, luckily, is not common, but it and other complications are much more likely to occur where expectant treatment is carried out than in those cases that are operated upon early.

With reference to the *after-treatment*, I have but little to say. I see that my patients, when there has been abscess, or any need of drainage especially, are put at once into their beds in the operating theatre and so conveyed to the ward to avoid, as far as possible, any unnecessary jolting, such as might occur if a stretcher is used for the transit from the theatre to the ward. They are given next to nothing by the mouth for the first twenty-four hours, then beef-tea and albumen-water, rather than milk, as the latter gives rise to flatulence. This, if present, is treated by the use of the rectal tube, and, if need be, by turpentine enema. Thirst is treated by slow rectal injection of water, half a pint to a pint at the time twice a day, and by small amounts of warm water by the mouth. The bowels are left alone, unless excessive flatulence should supervene; then saline purgatives, followed by enemata, are given. If a purgative is needed, say on the fourth or fifth day, I usually give castor-oil. I am sure I have seen cases of intestinal catarrh from the abuse of purgatives after operation. Morphia or any form of narcotic is avoided, if possible. If vomiting persist longer than the anæsthetic sickness, the patient should be fed by nutrient enemata of a fluid kind. Personally I have not much faith in solid suppositories, and only use them when the rectum obviously requires a rest from fluid injections.

Now let me next say something with regard to the after-conditions of the patients. In two there has been fæcal fistula. One case was that of a woman who, I believe, is now all right. The other was a man whom I happened to see only yesterday, and in whose case the fistula has healed two or three times, but has broken down. Whether that case will follow the usual run and eventually heal I do not know. It was a very bad case. There was gangrene of the appendix and acute peritonitis, with much suppuration at the time of operation. I hope that ultimately this man will get quite well; he has before now healed and remained healed for three or four weeks, and then the fistula has broken open again.

I know a lady on whom I operated in private, who subsequently had extra-uterine gestation. The appendix was gangrenous and purulent; she recovered and married, and was the subject of extra-uterine gestation on the right side, no doubt owing to the fact that the Fallopian tube had been implicated in the appendicitis. She

was operated on for the extra-uterine gestation and got perfectly well.

I should like to say just a few words about the fatal cases, because we may learn more from such than from cases, which run an ordinary course of recovery. These fatal cases are ten in number. Two of them I have put down as practically moribund on admission, suffering from the effects of general septic peritonitis. One of these was a girl who died four hours after the operation. There was a large purulent collection, which was opened, and the parts were, as far as possible, dealt with, but the unfortunate girl was moribund, and, as I have said, died four hours afterwards. The other case was practically just the same. There was a huge stercolith, the largest I have ever seen, and the patient died within twenty-four hours. The opening of his abscess occurred too late, and he was already in a toxæmic condition from general septic peritonitis. Both of these came too late.

The next case was a man who died from chloroform on the operating-table. Whether he would have recovered or not, had he not expired from chloroform, I think is doubtful, because his was a case where the abscess had, as far as we could make out, burst in the surgery, and when I operated the pus was all over the peritoneum. His was only the second case in which I used irrigation. As the pus was all over the peritoneum, I felt that I could not get it away by what I very much prefer—that is, sponging; and therefore I irrigated him with warm water. It was when this irrigation was over that he died, on the operating-table, with all the symptoms of chloroform-poisoning.

Another case was one suffering from an attack of general septic peritonitis, present at the operation, and he died five days afterwards. In spite of the operation, the general septic peritonitis went on its usual course.

Another case of general peritonitis died on the ninth day after the operation.

The next case was one of general septic peritonitis, and death occurred on the sixth day after operation. This was a case where there was pregnancy of six months' standing, and abortion, and where it was very likely, with the general septic peritonitis, plus the abortion, that the patient would die.

Another case was one where a deep-seated pelvic abscess was simply opened, and the patient died of peritonitis on the fifth day. The peritonitis may have been present when the abscess was opened, but of this I am not sure.

One case died on the nineteenth day. When that man came into the surgery I thought he would not live twelve hours, he looked so ill. He had sloughing of the appendix and a foul abscess at the time of the operation. I simply opened the abscess and did not hunt or seek for the appendix—his condition was so very bad. The appendix was in

a state of gangrene, and when it and a stercolith came out in the discharges two or three days afterwards, I thought he was going to recover, but he lived only for nineteen days and died in consequence of the extension of the sloughing from the appendix to the cæcum. At the post mortem the cæcum was a mass of gangrene. That is the only case in which I have seen this condition present. He died simply from exhaustion and blood-poisoning. His symptoms were a little more acute during the last two days of his life, but he had no peritonitis.

There is one case which I regret exceedingly, because I think it ought not to have been in the list; that is the case I have already touched upon, where the gauze was removed, all that was left of it, on the fourth day, and the peritonitis came on the day afterwards. I think that case most undoubtedly would have recovered if the gauze had not been removed so early.

In all these cases, then, that died—ten out of 125—the appendix was gangrenous, partially or entirely; and if you look at the analysis you will see that general septic peritonitis was present in four cases. I draw a distinction between general septic peritonitis and general peritonitis. Sometimes when you open the abdomen and operate you may find pus under the parietal peritoneum, and you may find quite deep down pus of quite a different nature—foul, stinking pus, about the gangrenous appendix—and this latter it is which causes general septic peritonitis. The deaths, therefore, are ten in number; all were acute cases; in all there was gangrene of the appendix, and in most of them general peritonitis present at the operation.

Before we part I would just say one word about the age of the patients. Only 7 of the 125 patients were over the age of forty; the great majority of the cases were between the ages of sixteen and thirty, 24 were over the age of thirty, and 23 below the age of sixteen. Therefore 78 out of these 125 were between the ages of sixteen and thirty. Only two of the cases ran into the fifties, both being fifty-six years of age.

I should liked to have said a good deal more, but of course one cannot on the present occasion, except to draw attention to the fact that the appendix was removed in 103 out of the cases operated on. I shall not trouble you with any further remarks just now, but I will take my leave of this most interesting subject by once more stating my firm conviction that early operation in acute cases is safer and better for the patient than waiting for any particular day or for any particular symptoms.

[Since the delivery of this lecture two more acute cases (one with abscess, one without) upon which I operated in 1895 have been found in the records of St. George's Hospital. Both these cases recovered, thereby reducing the mortality of acute and subacute cases to 8·8.]

A LECTURE ON SPA TREATMENT AND SOME OF ITS INDICATIONS.*

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IF I were to be asked for a definition of the title of this lecture I should, so far as concerns the first portion of it, find myself in a difficulty. A spa is generally understood to mean a health resort which is possessed of natural mineral waters having therapeutic properties. The term is derived of course from the town of Spa in Belgium, which has been renowned for its chalybeate waters since the sixteenth century; but inasmuch as these waters have always been used for bathing as well as for drinking, it is doubtful whether the expression "spa treatment" should not include bathing processes as well as the ingestion of the waters. Originally it is probable that bathing processes were so included, but the very decided tendency of the present is to limit the term to the effects of the waters as taken by the mouth. In some parts of England, Yorkshire for example, the building in which the mineral water is dispensed for consumption on the premises is itself called the "spa," so that it is evident that balneary measures have no place in the conception of the word as there employed.

In a former lecture I explained that we were in want of a word to express the science of the internal administration of natural mineral waters, and to fill this want I ventured to suggest the term "crenology." Now "crenology" is synonymous with the more limited application of the term "spa treatment" to which I have just referred, and as the burden of my remarks to-day refers to this matter I shall use these expressions as interchangeable.

But before considering the more limited aspect of the matter, let us glance for a moment at the therapeutic effects which we may expect from treatment at a spa, whether this be balneological, crenological or climatic, the results in short of removal from ordinary surroundings and the substitution of a life which is altogether different from

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that which is customary. Some one has said that it is easy to do a year's work in eleven months, but quite impossible to do it in twelve months. This apparent paradox contains a great truth—the truth to which we all subscribe when we recommend a holiday to a hard-working patient. The essence of a holiday is change: change of air, change of scene, change of diet, and, most important of all, change of thought. Some of us in this country are given to deplore the fact that patients are sent abroad by many physicians, but there can be no doubt that this element of change, including as it does language and customs, is more complete at a foreign station than it can ever be at home. We must remember that we have a cerebral as well as muscular and other systems, and that if portions of this cerebral system are habitually left unexercised and unstimulated they suffer in function, to the detriment of the whole organism. There can be no doubt that the good effect of a holiday is due as much to the stimulation and exercise of habitually unused cortical cells as it is to the rest and opportunity for recuperation which it affords to those in everyday use. In addition, therefore, to its purely physical advantages, a holiday tends to redress the mental balance which business and professional concentration is so liable to derange. The harassed man returns therefrom with his judgment restored, his sense of proportion renewed, and his capacity for concentration revived. Now, treatment at a well-selected health resort is a holiday, but it is a holiday which, in place of being haphazard, is supervised and controlled so as to obtain the maximum benefit which the circumstances allow to an individual case. The conditions of the times tend more and more powerfully to compel us into physical and mental grooves, and the aim of the thoughtful physician should be to assist his patients to the utmost of his ability to emerge from these grooves into a freer and a fuller life.

What I have called a haphazard holiday, one, that is, which is dictated merely by the convenience and inclinations of the patient, may fulfil all the necessities of the young and comparatively healthy, but when a man arrives at the age when, to meet the requirements of his ordinary work, his energies want husbanding, and, at the proper time, recuperating, such holidays as being ill-regulated both as to place and method are liable to be productive of as much harm as good. I have known

several patients who have returned from a haphazard holiday more exhausted and neurasthenic than when they set out. Properly conducted health-resort treatment may therefore be regarded as offering all the advantages to be derived from an ordinary holiday with this important element super-added, that the requirements of the individual case are carefully studied, to the end that stimulation and repose can be applied both in the manner and the degree most suitable. It is, in short, a scientific holiday on the principle of *ars est celare artem*.

And this brings me to the consideration of a point upon which Sir Hermann Weber, with his usual wisdom, is wont to insist. It is the great importance of choosing a thoroughly trained and sympathetic physician to whom you may confide your patient at the selected spa. Without his active, intelligent and tactful co-operation, be the climate never so suitable, the baths never so sumptuous, and the waters never so active, your best-laid plans will go awry and your patient will return to you unimproved and discouraged. I said return to *you*. Well, he may do so; more often, however, he will return, not to you, but to someone more experienced, or perhaps more fortunate in his estimate of the comparative merits of the various spas and of their practising physicians. It is a safe rule never to recommend a health resort without at the same time going into all the necessary details of the journey, the time to be spent there, and the physician to be consulted on arrival. The latter ought always to be written to as soon as possible and be put in possession of the known facts of the case. If you fail to do this you cannot legitimately quarrel with a man who, being obliged to form his own judgment on insufficient data, arrives at a conclusion which is not in consonance with your own. Complete candour of expression and businesslike promptitude in writing and answering letters are absolutely essential in all dealings between the physician at the spa and the one who recommends the patient. The wisdom of arranging, in advance, the details of the journey becomes obvious when we consider that invalids are easily fatigued by long travel, and that to arrive at a spa in an exhausted condition is not the best means of obtaining the maximum benefit from the treatment.

In reference to spas in general, I may say at once that I am not going to attempt any classifi-

cation of them. There are many classifications in existence, none of which are at all satisfactory, because, being based for the most part upon the inorganic chemical constituents of the waters, there is necessarily a good deal of bewildering overlapping. Moreover, some spas, Harrogate for example, have many different kinds of waters, and some places which have only one kind of water are able to claim, quite truthfully, that this water can, by suitable handling, be made efficacious in many morbid conditions which do not seem to have anything in common. The fact is, analysable constituents afford no reliable basis for classification, except where, as in Carlsbad and other purgative waters, some gross chemical ingredient is present, which, apart altogether from the fact that in them it appears in a natural state, is of acknowledged value when dispensed in the ordinary manner. And even in such cases it is often difficult, if not impossible, to say how much of the special effect is due to the obvious ingredient, such as Na_2SO_4 , and how much may be attributed to less well recognised constituents whose combinations or nascent activities have so far escaped elucidation. We know that what under ordinary circumstances appear to be very insignificant quantities of organic and inorganic matters may be very potent under circumstances which are unfamiliar. Who, for instance, would have supposed that half a grain of arsenious acid per gallon of any liquid, taken as a beverage, would act so powerfully as to give rise to a widespread and severe epidemic of arsenical neuritis? And yet such was the case in the recent Manchester epidemic where the arsenic was taken in combination with beer. It may seem curious to some, but I am convinced that our knowledge neither of chemistry nor of other forces working in nature is as yet sufficiently exhaustive to permit of a scientific classification of natural mineral waters. It has always hitherto been something in the nature of a conundrum why some waters which, on account of their want of chemical distinctiveness, have been termed "indifferent" should exhibit such very decided clinical activities, and it now appears that the clinical experience is being supported in the cases of, at least, some of them, by the discovery that they are radio-active. As I have before had occasion to point out, though laboratory work is full of usefulness as an adjunct

to clinical experience, where the two are in apparent conflict the event almost always proves the latter right and the former wrong, more especially where, as in this case, all the evidence which the laboratory can adduce is of a negative character. The time may come when the advance of chemical and other knowledge will explain the therapeutic merits which we now recognise in natural mineral waters, and will assist us in differentiating these merits; at present, however, we have only experience to guide us. We know that the waters at certain places are useful in the treatment of certain conditions, and we are content to profit by the knowledge, leaving to the future the scientific explanation of the facts. I say the waters *at* certain places rather than the waters *of* certain places, because for several reasons, some only of which are comprehensible, the treatment by the bottled and imported article is a very different matter to the treatment by the water as it issues from its source. Some part of the difference is due to causes which we have already considered, such as change of life, climate, and environment; another factor may be the nascent properties of the issuing water; a third, the impossibility of bottling radio-activity and possibly other undiscovered activities. But probably the most important consideration of all is the fact that at the spas the practising physicians are specialists, not only in the handling of the waters, but also in the treatment of the diseases for which these spas are famous.

Let us then, as clinicians and therapists, accept the facts of spa treatment as we find them, and let us do our best to inform ourselves in what conditions crenology may assist us, and to which spas we may most confidently look for that assistance. One way of approaching this matter is to take certain classes of disease and to enumerate the various spas at which they may be treated. Another, and in the time at my disposal I think a more convenient method, is to give a few instances of well-known spas and to indicate the kinds of cases which are suitably sent to them. But, first of all, let me clear the ground by explaining that I do not propose to say anything about gout, rheumatism, or the other arthritic states which constitute so large a proportion of the diseases which are commonly treated at health resorts. These conditions are very properly so

treated, but it is to the balneary rather than to the crenological element at such places that the acknowledged efficacy is to be attributed.

Let us begin, then, with the best known spa in the civilised world, namely Carlsbad. As everyone knows, this place, which is as beautiful as it is famous, is situated in Bohemia, not very far across the frontier from Saxony, the capital of which, Dresden, is so popular with English people. The Carlsbad waters are described as alkaline sulphated waters, which is merely a roundabout way of saying that their chief analysable ingredients are the sulphate and bicarbonate of sodium. But, as I have said, it is unwise to attach too much importance to analysable constituents, so let us proceed to consider what are the kinds of cases which may advantageously be sent to the place for a "cure." Well, if you go to Carlsbad in full season, the first thing that will strike you is the enormous number of unduly fat people that you come across, a fact which gives you the key to the main indication for selecting from among your patients those who will derive most benefit from a "cure." It is not that any very special point is made of the treatment of obesity there, but it is a fact that the place has specialised, so to speak, on diseases or conditions with which obesity is commonly associated. Chief among these are affections of the liver. In patients who have had one or two severe attacks of biliary colic the question often arises as to whether one ought not to recommend operation. The operation, as we know, is liable to be a serious matter, and we hesitate consequently to recommend it unless we are at the end of our resources. Now, in these cases, before any appeal is made to the knife, treatment at Carlsbad is an expedient which should always be tried, with this reservation, however, that it is not well without due consideration to send a thin patient there, nor, on account of the length of the journey and the severity of the treatment, is it ever wise to recommend the place to those who have been much exhausted by their attacks. I have known two patients who were sent there, not, I beg to say, on my recommendation, from this country, and who were almost immediately sent back without undergoing the cure; the one because she was so exhausted on arrival that any special treatment was impossible; the other, because the state of his general health did

not warrant the local physicians in subjecting him to the treatment. Such experiences are very mortifying, but they can easily be avoided by remembering that Carlsbad and Marienbad are suited only to the very robust, to the sthenic type of invalid, and that if treatment on the Carlsbad pattern is desired for those who are not robust, it may be obtained at Kissingen, Homburg, Wiesbaden and elsewhere. The man who habitually overeats himself, who takes too little exercise and too much alcohol, whose liver is enlarged, who suffers from piles, and who is learned in menus, that is the patient whom you may send to Carlsbad and Marienbad with every confidence that the result will justify your recommendation. I have bracketed Carlsbad and Marienbad together because these two spas lie, as you know, quite close to one another, and there is little, except fancy, to choose between them.

Now let us look for a moment at another world-famous spa, Vichy, and compare its main features with the foregoing. If we examine the analyses we notice at once that whereas Carlsbad contains a considerable amount of sodium sulphate together with sodium bicarbonate, Vichy has only the sodium bicarbonate to offer. This you would doubtless believe to make a very considerable difference in the kinds of cases for which the two places respectively were indicated. And yet it is not so. Broadly speaking, the maladies which are suitably treated at Carlsbad are equally suitably treated at Vichy. At both places gastric, hepatic and digestive disorders in patients of the sthenic type are those to which the chief attention is paid; at both a great feature is made of the management of diabetes and affections of the liver; the contraindications are the same at both, and the reputation of both rests upon a foundation of practical experience extending over generations. This being so, you may well ask why it is that in this country we hear so much of Carlsbad and so little of Vichy. Well, the answer is simple. It is merely a question of fashion. The members of our own Royal House have done much to popularise the former, whereas the latter has enjoyed no similar advantage. I repeat therefore that in spite of the difference in the chemical composition of their waters there is practically nothing to choose between these two spas in the efficacy of the treatment in suitable cases. A patient who will do well at Carlsbad will

do equally well at Vichy. This fact is interesting from many points of view and particularly important as illustrating what I have above insisted on, namely, the futility of classifications based upon mere chemical analysis.

In connection with patients of the Carlsbad type, but of an organisation not sufficiently robust for Carlsbad treatment, I have mentioned Kissingen, Homburg, and Wiesbaden. Let us take one of these, Homburg, a place which also owes much of its popularity in this country to the patronage of our Royal Family, and consider it in connection with another French spa, namely, Brides-les-Bains. Superficially the two places have little enough in common. The one is a fashionable, cosmopolitan, accessible spa close to Frankfurt and the Rhine and hence on the high road to everywhere; the other is a comparatively unknown, essentially French and, until recently, an inaccessible little place in the Savoy Alps, not very far from Aix-les-Bains. And yet, on the merits of the complaint as distinguished from the patient who is the subject of the complaint, it would not be easy to make up one's mind as to which would be the most suitable place for treatment. The composition of the waters at the two places is essentially different, and the methods of using them are by no means identical; nevertheless, a course at either would show excellent results in those cases of gastric, hepatic and metabolic disturbances for which Carlsbad or Vichy would be too severe. The fat man is as much in evidence at Brides as he is at Carlsbad or Vichy, and if he seems to be rather less obtrusive at Homburg, the reason is that his proportions become obscured by the numbers of people who visit the place as mere pleasure-seekers. The equipment of Brides-les-Bains for all forms of health resort treatment is very complete. At Brides itself they drink the slightly purgative waters; at Salin-Moutiers, two miles distant and connected with Brides by electric tramway, there is an excellent bathing establishment with strong brine waters; whilst at Prolignon, half way up the mountain, there is a delightful hotel, situated at a very considerable altitude, where a climatic "after cure" may be enjoyed in most peaceful and beautiful surroundings. Brides is too little known in this country. This is due partly no doubt to the fact that until recently it was inaccessible. Now, however, it is so no longer. It may be reached in

twenty-three hours from London (Carlsbad takes thirty-one hours, Vichy eighteen hours, and Homburg nineteen). Arrived there the climate, the society, the surroundings and the methods of treatment are all that can be desired, especially for those who wish to avoid the fashionable crowds which throng to the better known places.

A spa of a character altogether different from the foregoing is Contrexéville in the Vosges mountains, about eighteen hours from London *via* Paris. If Carlsbad and Vichy may be called pre-eminently the hepatic spas, Contrexéville may with equal truth be called the renal spa. For reasons to which I have already alluded, we are not concerning ourselves to-day with the chemical constituents of the waters we are considering, but I may mention that the principal ingredients in those of Contrexéville are the sulphate and bicarbonate of calcium, hence the name "earthy waters" which is generally applied to them. Now, on general principles, the salts of calcium do not appeal to one as exactly the salts which one would select for administration to patients suffering from renal and vesical calculi, and yet it is precisely in these conditions that the waters of Contrexéville are most highly prized. Could any fact afford better evidence of the uselessness of estimating the therapeutic value of a mineral water by its chemical composition alone? For the reputation of Contrexéville rests on a solid basis of extended clinical experience. When we have discounted the improbable, but by no means impossible, stories of the spontaneous breaking up of large vesical calculi as the result of taking the waters, there remains an amount of reliable testimony, which is not to be gainsaid, to the really wonderful effect of the waters in ridding the system not only of renal gravel but also of the tendency to its formation. The waters are diuretic, and in large doses laxative, but they would seem, in addition, to exercise a solvent as well as an antiseptic influence. The forms of gout, other than arthritic, which are variously called goutiness, suppressed gout, and the uric acid diathesis, are accompanied, it is supposed, by some degree of renal inadequacy, and, owing to the flushing and other effects of the waters, such conditions do well at Contrexéville. I know of no spa which you may recommend with more confidence, not only in such conditions but in all morbid states of

the urinary organs which are not caused by cancer, tubercle, and other incurable disease. The physicians claim to make a speciality of chronic nephritis, both tubal and interstitial, and if the claim is a good one, which I believe it is, the good effects are not in any way due to the climatic conditions, because, being of an essentially bracing character (the place is situated at an altitude of 1100 feet), these would, other things being equal, be inimical to renal troubles. To Contrexéville, then, you may send those of your patients who suffer from renal colic, from chronic nephritis, and from chronic cystitis (never send an acute case of any kind to a spa), and those who are convalescing from operations upon the urinary tract. I have known of one case of a floating kidney in a man which ceased to give trouble after a course at Contrexéville, but whether the organ ceased to wander or not I cannot say. It is quite conceivable, because many of these cases are due to the organ being chronically congested and therefore unduly heavy, and the removal of the extra weight might easily lead to a disappearance of the trouble. There is another kind of patient whom you may send to this spa with great hopefulness, a kind of patient who is very liable to tax your ingenuity to the utmost, and on account of whom you may very easily, and very unjustly, lose a great deal of credit. I mean the child who suffers from persistent nocturnal enuresis. These cases may be treated at home by the imported water, and are very often successfully so treated, but it is always preferable to send them, if possible, to the fountain head.

Of all forms of natural mineral waters it is probable that those containing iron have been appreciated the longest. There are many iron water spas in Europe, but the best known are Schwalbach, Spa itself, and St. Moritz. In all these the contained salt of iron is the bicarbonate and they all contain in addition a fair quantity of free carbonic acid gas, which is believed to facilitate the absorption of the iron. Of the three places St. Moritz has one definite advantage over the other two, namely its elevation, which amounts to very nearly 6000 feet. High altitudes, as you know, increase the number of red corpuscles in the blood, and they have consequently been prescribed with considerable success in anæmic states. Now, at St. Moritz you have in addition to the

high altitude a mineral water which, though not so rich in iron as some, is not inferior in efficacy to any other in Europe, and this combination of factors is calculated to bring about better results than either alone. Owing to its notoriety as a winter resort for consumptives St. Moritz's reputation as a chalybeate spa has recently become somewhat obscured; and you must indeed be rather careful in recommending it, for patients are liable to assume that you do so because you entertain a suspicion of phthisis which you are not willing to express.

In the matter of elevation there is nothing to choose between Spa and Schwalbach; Spa is 1000 feet above sea level, Schwalbach rather less. Spa is much the more accessible from this country, and there is more life there than there is at Schwalbach. In favour of the latter, however, may be urged its peace, its beautiful woodland surroundings and the admirable management of the place as a pure health resort. The patients whom you would send to these places are of course those suffering from anæmia, especially chlorosis. In the case of St. Moritz, its great elevation will remind you to be careful about sending excitable people there, and to avoid even the mention of it if the case be one in which the kidneys are deranged. The typical case for this spa is the fat, chlorotic girl of lymphatic mien and lazy habits who has no organic disease. To Spa or Schwalbach you may send anyone whom you think a course of iron would suit. And remember, in connection with these places, that improvement which has resulted from treatment at a chalybeate spa is always of much longer duration than one which follows a course of iron at home, so that in cases of constantly recurring chlorosis it is always well to recommend a trial of one of these resorts.

It sometimes happens that one member of a family, say the father, is suffering from a condition of the Carlsbad-Vichy type, while another, say the daughter, is the subject of an affection of the Schwalbach type, and that they wish to go to the same spa. In such cases it is always well to keep Kissingen in mind. I have already mentioned the place as an alternative to Carlsbad for patients who would find the course at the latter too severe. It is a charming place, very well managed, and replete with every convenience for balneary and crenological treatment. In addition to its own

common salt waters, however, those of a neighbouring chalybeate spring are to be obtained there. The latter are brought in pipes from their source at Bocklet, a village four miles away, and are very useful in the same conditions as the waters of St. Moritz, Schwalbach and Spa. The Bocklet waters have an establishment all to themselves at the village, but the installation is primitive compared to the comfort and luxury of Kissingen.

The consideration of sulphur water spas would afford sufficient material for a single lecture, and that by no means a short one. In the brief time which remains to me I have to point out that these spas have, many of them, very little in common except the presence of sulphuretted hydrogen in their waters. They form a very large group, and if you recall those which are best known, Aix-les-Bains, Aix-la-Chapelle, Luchon, Harrogate, Cauterets, and consider the diseases in the treatment of which each enjoys its reputation, there is no escaping the conclusion that the special virtue of each resides in some ingredient or activity other than the presence of the sulphur compound which gives to them all a common and characteristic odour. Even if we narrow the issue and consider only the group of sulphur water spas in the Pyrenees—spas which are close together and whose analysable constituents differ but very slightly—and inquire in what diseases each has specialised, we must arrive at the same conclusion. For example, Luchon has a reputation in retrocedent gout and in diseases of the skin; Cauterets has made affections of the larynx a speciality, and is thronged in consequence with singers, orators, clergymen, and all whose vocal cords are strongly used; Eaux Bonnes is much visited by those suffering from pulmonary affections, particularly emphysema and phthisis; Eaux Chaudes is a resort more especially for women suffering from uterine troubles, and is credited with having cured sterility in the Queen of Navarre, the mother of Henry IV. St. Sauveur is also a ladies' spa which is said to have remedied sterility in another famous case, namely, the Empress Eugénie. There are in this group other spas with different reputations, but it is useless to multiply instances. Analytically they have their H_2S in common; clinically they have practically nothing. This affords yet another example of what in this lecture I have sought to impress upon you, namely, the hopelessness of endeavouring to

arrive at a satisfactory classification of spas by a consideration of chemical ingredients alone. I do not profess to offer you one which is satisfactory, but the first step to the attainment of that end is to divest our minds of anything which obscures the real issue, and this the chemical classification certainly seems to do.

Lest I should be taken to task for haying in the foregoing remarks confined my attention exclusively to foreign spas, I propose to defend myself in advance, and shall conclude by quoting the following passage from a well-known authority, Dr. Burney Yeo:

"No amount of patriotic advocacy of our own mineral springs will alter the facts that we have no sparkling gaseous chalybeate springs like those of Schwalbach; no hot sulphur springs like those of Aix; no acidulated alkaline springs like those of Vichy; no gaseous salt waters like those of Homburg and Kissingen; no hot alkaline aperient springs like Carlsbad; no simple gaseous, slightly saline, acidulated springs like those of Selters and Apollinaris; no mud or pine-leaf baths as at Marienbad and Franzensbad; and even the common non-gaseous aperient 'bitter' waters we are obliged to import from abroad, as is evidenced by the large consumption of Friedrichshall and Hunyadi, of Pullna and Æsculap waters."

Cordially as I agree with this passage in the main, I should like to qualify it by saying that it is not so much that we have not got the waters, for in reality we have many which are possessed of conspicuous merits. The difficulty lies in the fact that, with exceptions which could be counted on one hand, we fail to make any adequate arrangements for the comfort and amusement of visitors.

W. G. MACCALLUM and W. B. CORNELL conclude that obstruction to the outflow of blood from the veins of the orbit produces at once exophthalmos, which is relieved by the establishment of a collateral circulation. This process, however, is completed so slowly that in the meantime the orbital tissues, as well as the tissue of the face, become very oedematous, thus adding to the exophthalmos. Entirely independent of any circulatory changes is the exophthalmos produced directly by the stimulation of the cervical sympathetic nerve. This protrusion is due to the peristaltic contraction of the orbital muscle.—*Med. Record*, vol. lxvi, No. 17.

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A CLINICAL LECTURE

ON

PARENCHYMATOUS NEPHRITIS.

Delivered at St. Bartholomew's Hospital

By SIR DYCE DUCKWORTH, M.D., LL.D.,
F.R.C.P.,

Physician to the Hospital.

GENTLEMEN,—I am going to discuss with you to-day the subject of parenchymatous nephritis. Several patients who are in my wards at the present moment afford good examples of this condition. The first case I will call your attention to is that of a youth, æt. 19, in Matthew Ward, a tailor's cutter, who came in on April 1st complaining of puffiness of the face and swelling of the legs. He states that he was in his usual health until March 25th, when he suffered from a cold. Two days later his eyelids were puffed, and five days afterwards his legs swelled. He had noticed nothing amiss with his urine. He had had no severe illnesses, with the exception of scarlet fever when he was a child. The family history was that his father suffered from lumbago, and his mother had "rheumatic gout." There were five healthy brothers and sisters. His aspect generally was that of a healthy youth, but the face was flushed, the eyelids puffy, and the conjunctivæ glistening. He had, indeed, what has been called since Bright's time, "Bright's bright eye." There was nothing noteworthy about the chest, but the first cardiac sound was booming in quality, and the aortic second sound was accentuated. The apex was in the natural place. The pulse was 76, and of rather full tension, the artery somewhat thickened; legs swollen, loins natural. There were no other noteworthy features about him. The urine contained a good deal of albumen and some blood. The temperature was natural, and remained so for four days, after which it rose to 99°6', to 103°4' on the sixth day after admission, and to 102°8' on the

seventh day. The condition of the urine told its own tale. The kidneys were evidently engorged, and the tubules choked with a catarrhal surplus of epithelium. This feverish attack did not appear to be connected with the state of his kidneys; and it was explained by the onset of follicular tonsillitis. Swabs were introduced into his throat and cultures made of the secretions of the fauces, but they showed no specific form of microbic growth, and we were able to exclude anything like diphtheria. The temperature, moreover, was too high for an ordinary case of diphtheria. His throat yielded to treatment for a few days, and then became worse. There was an abscess in the tonsil, and it was opened and pus came out. After that his throat symptoms disappeared. But during all this time he was passing a very fair amount of urine; it was not scanty, as it sometimes is in such cases. He passed 66 and 68 ounces, a very good average amount. You know that the output of urine in the normal healthy man is about three pints in the day. In the early stage of many of these cases it is common to find the quantity of urine very materially diminished.

We may therefore regard this as a very mild case of acute nephritis which has yielded satisfactorily to treatment. I show you his urine at the present time, and you can see that it is perfectly clear, though the colouring of it is somewhat peculiar; it is a pale rosy pink. That colour is accounted for by the medicine he is taking. It is one of the aniline salts or dyes called rose aniline or fuchsin, a very strong pigment, which disperses itself throughout the body and changes most of the secretions according to the quantity which is given. By means of Esmarch's solution there is an almost inappreciable amount of albumin falling to the bottom. This represents a stage which is a near approach to complete convalescence after an attack of acute nephritis.

The second case is that of a man in Matthew Ward, a carpenter, who came in on April 22nd. His age is 32. He was reported to have been well until April 6th, when his vision became dim and he had running from the eyes. His legs swelled and he vomited each morning for a week, but had no headaches. The family history was unimportant, with the exception that his father suffered from gout. He was a pasty-faced man with glistening conjunctivæ. We found the urine

to be of specific gravity 1020, containing blood and granular casts, and he passed on an average 45 ounces of it each day. The heart's apex was in the line of the left nipple, and there was a short murmur at the apex with the first sound.

From the look of this patient, the pasty-faced aspect, one thought he had been suffering for some time from a smouldering chronic form of nephritis, and that this attack possibly constituted an acute onset, although he considered himself well up to April 6th. He has also improved under treatment. Here we have a specimen of his urine. He is not taking the fuchsin, and his urine is not of the pink colour seen in the first case; it is pale and of a distinctly smoky tint. I call your attention to this tint, which is very characteristic of the urine of nephritis; it is exceedingly like the colour of a rock crystal found in Scotland called the Cairngorm, a smoky-coloured quartz. It is due to a small quantity of blood in the urine; the more blood it contains the more smoky its hue. When there is a large quantity of blood in the urine the urine is obviously bloody and becomes of a deep purple or chocolate hue. As a rule, you can procure a reaction of blood with freshly made tincture of guaiacum and ozonic ether whenever the urine is smoky, but not always. In this case we examined the patient's urine and found only a little blue tint, so there was very little blood. Yet the urine was distinctly smoky. This tube represents albumen which has been thrown down by Esmarch's solution. It represents nearly one gramme of albumen per litre of urine. This man has been decidedly improving since he came in, having been kept to bed and fed appropriately.

A third patient has lately been sent into Faith Ward, a woman æt. 50, a housewife. She has had three children and one miscarriage. She has general dropsy, is pasty-faced, and has lately complained of blurred vision, the result of albuminuric retinitis. She has also pericarditis, though without any pericardial pain or pyrexia. There is but little albumen in her urine. Its specific gravity is 1006, with granular and hyaline casts, and a mere trace of blood. Her legs are pallid and cedematous, and have been swollen for several years; she has headache and recently has had nausea.

Her pericarditis was noteworthy because she had no fever whatever. So here we have an illustration

of pericarditis occurring without any pyrexia ; her temperature indeed was rather subnormal. Moreover, she complained of no pain. It is only possible to meet with cases of obvious pericarditis of that character—that is to say, without fever and without pain—in cases of chronic Bright's disease like this. And if pericarditis occurs in nephritis it is always a very serious symptom, and the case may be put down as grave, especially when I tell you that she suffers from dimness of vision, which she has only just begun to complain of, especially in the left eye. That raises the suspicion of the possibility of retinitis. Most of you perhaps know that in the course of chronic nephritis a form of retinitis is apt to supervene, in which greyish patches appear upon the retina, sometimes with tortuosity of the vessels, and small hæmorrhages and a degree of optic neuritis. This woman's discs show that condition ; small hæmorrhages and obvious neuro-retinitis. So her case comes into a more severe category than the other two which I have related to you. And although she is comfortable and complains of nothing, and has no feverishness, her condition is much more grave. In fact, retinitis and pericarditis in any case of this kind constitute two of the most important and serious symptoms which can be met with. So one would not prognosticate for her a very long lease of life. And yet, as I shall show you presently, the subject of prognosis in nephritis is exceedingly difficult, and you may be entirely misled. At all events, her case is the most grave of the three. And there is another peculiarity about her case. Here is her urine, pallid, hardly smoky, slightly opaque, and probably it will throw down a good deal of mucus. The same test has been applied as to these other urines, and it showed mere opacity with a little cloudiness at the bottom, indicating that there is only a small trace of albumen. Yet although there is so little albumen, in consideration of the facial aspect, the swelling of the legs, the history of headache and vomiting, and the presence of pericarditis and the retinitis, one thinks more gravely of her case than one would if she had a great deal of albumen in the urine without these more important symptoms.*

Those are the three cases which I propose to bring before you to-day. In considering disease

of the kidneys we have to take into view three classes of structures : (1) the tubal system, (2) the interstitial connective tissue, (3) the vessels, and especially the arteries. You may say there are other anatomical structures. Yes, the kidney has nerves and lymphatics, but unfortunately we know nothing about the nerves of the kidney in nephritis ; nor do we know anything about the lymphatics of the kidney in nephritis. They make no sign, and our attention is not directed to them. There are no doubt new chapters in pathology to come some day in connection with the nerves and lymphatics which are affected in Bright's disease or nephritis. Now, each one of these three systems may give rise to a special form of renal disorder. You may find an affection of the tubal or secreting system leading to a tubular nephritis or parenchymatous nephritis. And there are the acute and the chronic varieties of parenchymatous nephritis.

Now, with regard to the interstitial connective tissue. By an overgrowth and thickening of it there arises a condition leading to fibrosis or cirrhosis if you like, which fills up the kidney and hardens it, and strangles the tubes which it is meant to support. It constitutes another form, which we are not concerned with to-day, interstitial nephritis. Another name applied to the same condition is granular, another is contracting kidney, because all fibrous tissues when they are young tend to harden and contract. Sometimes this variety of kidney is called the small red kidney, and some call it the gouty kidney, which is not a very good name. Those all pertain to an involvement of the interstitial tissue, to the hard cirrhotic form of Bright's disease. In the tubal variety you find a large white kidney, ending in a contracting kidney if the patient live long enough. The third anatomical element of importance is the vessels, more especially the arteries ; and they are liable to sclerosis, to a hardening and thickening of their tunics, especially their inner and middle coats. And there is a peculiar form of degeneration known as waxy or lardaceous degeneration ; which is a disease we used to see plenty of but of which we now see very little. The vessels are primarily affected by lardaceous degeneration, and that is apt to occur as an outcome of syphilis, or where there has been a large loss of pus from the body for a long time, such as with empyemata or neglected abscesses. These conditions, unless

* This patient shortly afterwards became restless, with cerebral symptoms, and died, owing to uræmia.

curtailed by surgical or other active measures, are apt to result in this degeneration, which is likely to involve the blood-vessels in the kidney, in the bowel, in the heart, in the liver, spleen, and indeed throughout the body. Here, then, we have an anatomical basis for different kidney diseases, and during life you are able to say by the character of the case which system of the kidney is chiefly affected. All the cases which we have spoken of to-day come under the first heading, all affecting the tubal system. They are spoken of as being in either the acute or in the chronic stage. The first two were acute cases, and they are on the road to recovery, but we cannot hope for the same in the third case, which is one of the chronic form. We do not speak to-day of the granular kidney. The first and second varieties of kidney disease are recognised clinically with readiness. The patient who is the subject of the interstitial form has a different aspect from the patient with the first form: instead of being pallid and pasty-faced he is generally bright, healthy, and ruddy, and looks like one who would be regarded as a healthy man, and likely to live for many years. But perhaps his kidneys are contracted, and he is liable to have a fit of apoplexy and die, without the disease having been suspected. Very often there has been no albuminuria. He has passed a large quantity of urine, and he may complain of headaches and other symptoms which the experienced eye and hand and ear could detect if they were looked for, but they are often passed by and the patient regarded as healthy. So you have the little red-faced man with the little red kidney. It is quite another condition in chronic nephritis, for there the patient is large, pasty-faced, sallow, and there is always more or less albumen in his urine. He is also dropsical and becomes more so; he suffers from heart symptoms, and ultimately dies. In such a case when you examine the body you will find the kidney is very large and white. So you have the person with the puffy white face and the large white kidney.

These are somewhat academic conceptions as to the tissues which are affected, but they are useful in classifying in the way I have indicated. But note now that both during life and in the dead-house we find all the tissues involved in any case of nephritis. If any one of these cases of which we have been speaking had ended fatally, we

should have found not only the tubules involved but the connective tissue also, and that thus there was some interstitial growth in progress. And so microscopical sections of the kidney in any of these cases show changes in all these elements. The tissues are involved in the acute stage just as they are in any other inflammatory stage. So practically there is no such thing as pure tubal nephritis, or a pure interstitial nephritis, or a pure vascular nephritis. They are all more or less mixed. So each of these cases has to be regarded strictly as a mixed nephritis, that is to say mixed in the sense of having all the chief and important component tissues of the kidney involved. Still, it is a good plan to remember the elements that are primarily invaded, for without question in the cases we have had before us to-day the tubular elements are most involved, whereas in the small contracting granular kidney it is the interstitial elements. It is impossible to have the interstitial elements involved without the affection telling very seriously on the tubes. Lardaceous or waxy change also leads to material alteration in the tubular system of the kidney. There is in this variety a large smooth kidney with these hard modified arterial twigs. What is to be done for patients presenting signs of tubal nephritis? They often think they have taken cold. There is headache, pain, stiffness, sometimes catarrh of the bronchi as well. They do not notice a slight degree of swelling of the legs, and that is especially the case in the lower orders. The average working man can tell you nothing about his urine. Puffy face and eyelids should always attract your attention. There is puffiness or dropsy of the face and eyelids where the connective tissue is very loose, or in the scrotum, and those tissues rapidly fill with dropsical effusion. That should always suggest the possibility of albuminuria. The urine in these cases is often loaded with albumen, and more or less tinged with blood. Sometimes there may be pain in the back. The urine at once tells the tale. If you could see the kidneys at this period you would find that they were engorged, and the tubes choked. Now the fact that there is tension of the renal capsules in these cases has lately enlisted the attention of surgeons. And so it is now proposed that inasmuch as capsules of the kidneys are supposed to be in a state of extreme tension in acute nephritis, it may be

desirable to relieve this. One of the axioms of surgery is to relieve tension wherever it is found. The suggestion is to make an incision into the capsules and let the kidneys bleed and in that way relieve themselves. I have no experience of that treatment; I was going to say I hope I never shall have, because I disapprove of it. I should regard it as an unwarrantable intrusion, and a rude method which is not necessary. If we put a patient into bed and keep him warm, promote the action of the skin, and feed him properly with simple food, matters will gradually right themselves, especially if brought early under treatment. The longer such a case is neglected or badly treated, or exposed to cold, or the patient indulges in ordinary food, the more difficult it will be to treat. But if the case is promptly put under treatment, especially in the case of young people with good constitutions, there is likely to be recovery. You know that nephritis is one of the conditions which may be looked upon as a sequel to scarlet fever. This form of nephritis falls more especially on the glomerular system. But such cases are largely due to negligence or improper exposure of the patient. Nephritis after scarlet fever nearly always comes on at the end of the third week, and it can generally be avoided by keeping the patients in bed until after the third week, and taking special precautions for several weeks after that. That is why scarlet fever is such a troublesome complaint; it takes such a long time for the patient to recover soundly. The way to be soon well of scarlet fever is to be long ill, especially if you wish to avoid complications such as nephritis. Many cases have started in that way and gone smouldering on, unappreciated and unrecognised, until they get into the stage of the large white kidney. The first patient had scarlet fever when he was a boy. Nephritis is apt to occur in people who pass from a hot to a cold environment while the skin is acting freely. Added to that is the fact that the habits of the so-called working-man are often careless and foul, together with the taking of large quantities of bad beer. If to these are added exposure to cold and wet, you will see that the conditions are very favourable to attacks of acute nephritis. Therefore we find it very common in hospital practice, that is to say much more common amongst the lower orders than among the upper classes, who as a rule take care of themselves, and are not similarly

exposed. Unless these cases are promptly treated they drift into the chronic form, which is one of the most intractable disorders we are called upon to treat.

Now I want to say a few words about prognosis. It is very difficult to forecast the outcome of any case, and for this reason, that all people are not alike; they have peculiarities and temperaments, diatheses or qualities which are peculiar to them; they have tendencies, proclivities. One man has a tendency in one direction, another in another. There is no medicine for disease, but there is a medicine for individuals. We do not treat diseases: we treat patients suffering from diseases. With care, comfort, good nursing and warmth the patient should go on well if he has an undamaged constitution. But some persons are more vulnerable than are others, especially those of a strumous habit of body. A strumous individual is vulnerable at all points; he is a bad subject for any disease—for pneumonia, for anything irritative about the throat, and especially for the invasion of tubercle bacilli. So, if such a person suffers from acute nephritis it will go hard with him; he will be a long time recovering from it and in many cases it will eventuate in chronic Bright's disease. I remember the case of a gentleman who became the subject of nephritis, and was very ill. He was under the care of a very eminent physician, who gave him a year to live. On hearing this prognosis the gentleman gave up his partnership, and determined to live out his last year as happily as he could. He went to a seaside resort and was exceedingly careful how he lived: he conducted himself very prudently, took milk, and a simple, unstimulating diet. That was thirty years ago, and he plays golf to this day. If a man is prudent and of good constitution, can control himself, and conform to the necessary injunctions, especially in the matter of exposure to cold and wet, and has regard to the dangers of over-eating, he will be likely to get well.

With regard to the treatment, a warm bed, bread and milk diet, or milk and barley water, are most useful. Whey is of special value in acute nephritis; there is no better drink. The patient may take two or three pints of whey in a day. He may also have arrowroot, bread and butter, biscuits, and if he is a very hungry individual he may have a little mashed potato. Do not give these patients meat or strong foods. See that the nursing is

properly done and that your orders are carried out, and then you will find this smoky urine clearing day by day, the albumin diminishing, and the skin beginning to act, especially if you employ appropriate remedies. The remedies are very simple. If there is much blood in the urine you may dry-cup the patient. If he is strong, you may employ wet cupping, taking 12 to 15 ounces of blood from the loins. This is specially effectual because there is a direct vascular connection between the skin of the loin and the interior of the kidney. Warm poultices on the loins are also of great use. Antimony in the form of antimonial wine is very good in half-drachm doses, combined with nitrous ether and solution of acetate of ammonia. That is all that is wanted, with the exception, perhaps, that at the outset you should give a calomel purge, two grains of calomel and half a drachm of compound jalap powder, and afterwards be content with giving every other morning two teaspoonfuls of the confection of jalap. That clears the renal tubes and diminishes the dropsy in the limbs and face. If the urine does not clear up in a few weeks' time on this treatment, you may review the state of the patient's constitution, and see if there is any special cause for the failure of these measures. Ascertain if there is any family delicacy which will explain the rebelliousness to treatment. Cases may go on in spite of treatment and drift into the chronic form, and that, according to the patient's constitution, is more or less grave. We see many of these, but these patients cannot be kept long enough in hospital to get soundly well, and that is one of the limitations of hospital practice. In this hospital we keep them longer than in any other hospital in London, thanks to the generosity and goodness of the governors. Get your patients soundly well, especially of their albuminuria. But in spite of our wishes and advantages here, many of these patients go out with a little albumen in their urine, and they go back to work again, and to their drink again, and expose themselves to one bad influence and another, and probably they will come back again with another acute attack.

The next medicine is iron, which is of the greatest use. We generally give it as ammonio-chloride of iron in the form of Basham's mixture sometimes combined with digitalis. Nearly all these patients become anæmic. The amount of albumen lost is very little; a single egg taken each

day would more than supply the loss of albumen in the urine. But this constant drain appears to have some power of impoverishing the system. The question has been raised whether there is an internal secretion of the kidney, apart from the functions of the tubular system, which has to do with the general nutrition of the body; but this is an abstruse matter which does not concern you at present. We do not know of the existence of any internal secretion, but patients become cachectic and anæmic apparently quite beyond the degree which would be accounted for by the mere loss of albumen in the urine. But iron seems to be of great help in restoring the blood to its proper state and diminishing the quantity of albumen passed. Another medicine is fuchsin or rose-aniline. We are giving doses of one to ten grains in the day. It sometimes diminishes the flow of albumen, and has the merit of doing no harm even if it does no good. These cases of which we have been speaking can be seen in the wards. Two of them are going on well, and probably will recover. The woman we think badly of. There are many surprises in store for us in the course of nephritis, for such patients will often live beyond the period which we should apportion for them. And as I have pointed out already, much depends on their environment, and the way in which they live and protect themselves.

WE have received from Constable and Co., of Westminster, a copy of Mr. Cecil H. Leaf's volume entitled 'The Clinical Causes of Cancer of the Breast and its Prevention, with Analyses of 100 Cases.' Mr. Leaf says that the four most common causes of cancer of the breast are errors of lactation, family history of consumption, injury, and worry and anxiety. He concludes that cancer of the breast is due to a combination of these causes. In order that the conclusions he has arrived at should be justified by facts Mr. Leaf has carefully taken and analysed the histories of 100 cases and the volume is essentially a record of facts upon which the conclusions are based. All the cases have been admitted into the Cancer Hospital under his own care or that of his colleagues, and abstracts are supplied in which the chief facts are arranged in a tabular form. This work thoroughly deserves the praise it has received.

CASES OF FRACTURE ILLUSTRATING MODERN METHODS OF TREATMENT.

By J. JACKSON CLARKE, M.B.Lond., F.R.C.S.,
Surgeon to the North-West London and City
Orthopædic Hospitals.

THE following cases appear to be worthy of publication in that they illustrate certain aspects of modern methods of investigation and treatment of fractures that may come to the notice of any practitioner, and hence the issue of such cases is of great import.

Ununited fracture of the femur—A lady, æt. 27 years, brought to me by Dr. Percy Evans. She had broken her right thigh a year previously in falling from her horse. The fracture had been treated in the country when the accident occurred, a long splint being applied. When the patient was allowed to walk she was extremely lame. At the first consultation I found that when the patient was lying down the right lower limb was three inches shorter than the left. The fracture was situated between the upper and middle thirds of the femur, and the fragments were in the usual relative positions—*i.e.* the lower end of the upper fragment was tilted outwards and forwards, owing to flexion and abduction at the hip-joint; it was also rotated outwards. The lower fragment was drawn up behind the upper and rotated inwards. The X-ray photograph (Fig. 1) shows only the upward displacement owing to its being taken from the side. When the patient stood up the shortening was even greater because the false joint allowed the fragments to glide on one another. Seeing that the patient was young, we decided to recommend an operation for reuniting and wiring the fragments.

As a preparation for the operation the patient was sent to the seaside for a month. On her return the false joint had become even more flail-like in character and the shortening was increased.

The operation was done on August 15th, 1902. Dr. Evans assisted me and Mr. Henry Davis gave the anæsthetic. The operation consisted of two stages: (1) Correcting the shortening as much as possible by a screw-extension—a windlass acting by means of a roller-towel fixed by a clove-hitch above the knee, and as counter-extension, a padded

projection being fixed to the table and placed against the right tuber ischii. The latter arrangement was found not to act very well, and during the operation it was replaced by a second roller-towel placed in the perineum external to the right tuber ischii and carried to the top of the table, where it was fixed; (2) exposing and preparing the bones: an antero-external incision about five inches long was made and the ends of the fragments were cleared by a few touches of the knife. Very little attempt at repair was found and the capsule of the false joint was found to be of the slightest character, the upper end of the lower fragment being covered by the crureus muscle. The windlass was then again put into action, and the bones were drawn as nearly as possible into apposition. When the elongation had reached its maximum (*i.e.* with an overlapping of about one and a half inches) the muscles became very taut and hard. In order to obviate the tendency of the upper fragment to project forwards and outwards a segment was cut from the anterior half of its lower end, whilst a similar piece was taken from the posterior portion of the lower fragment to form a tenon when placed together. The prepared surfaces were then drilled and the sawn surfaces of bone adjusted, a stout well-annealed silver wire being passed through the drill-holes and the ends wrapped round the reunited bone (see Fig. 2). The wound in the soft parts was closed by silk-worm gut sutures. The limb was then put up in a modified Thomas's knee-splint. As far as concerned the bone repair was uninterrupted and rapid, but the patient developed a moderate degree of fever, which was found to be due to an abscess (probably caused by some clot) deep among the hamstring muscles at the back of the thigh. This was opened, leaving a sinus which ultimately closed under daily irrigation of 1–40 carbolic lotion. The result of the operation is perfectly satisfactory. The bone is as solid as the normal femur; the flail-joint with something over three inches of shortening has been replaced by a sound limb with one and a half inches of shortening, one inch of which is accounted for by the necessary trimming and overlapping of the fragments to make the tenon and the rest to some of the abduction of the upper fragment still remaining.

Remarks.—The open operation for repairing an ununited fracture is a formidable one, one

that some years ago not infrequently ended in failure and sometimes in disaster, so that many surgeons ceased to attempt it. By careful shaping and adjusting of the fractured surfaces and fixing them securely with stout silver wire, I believe a good result is to be anticipated. The force required to diminish the shortening and the

not have occurred. The modified Thomas's splint answered perfectly, and being arranged to fit into sockets in the patient's boots, enabled walking to be resumed much sooner than would otherwise have been safe.

T-shaped fracture of the humerus into the elbow-joint, with paralysis of the musculo-spiral nerve.—A



FIG. 1.—Skiagraph in a case of ununited fracture of the femur, lateral view.

mechanical appliances and the evolutions necessary to apply the stretching force militate against absolutely aseptic operating. In the present instance an abscess formed some distance from the bone, in spite of every care in preparation of the room, patient, instruments, and surgeon's hands, etc. Since the time of this operation I invariably wear rubber gloves in operating, and had we done so in this case the abscess might

lady æt. 23 years, sent to me by Dr. A. J. Hull. The patient had fallen from her bicycle on September 20th, 1903. She was examined under an anæsthetic by Dr. Hall the same day and a diagnosis of T-shaped fracture of the humerus was arrived at. The patient was warned that some stiffness of the elbow might remain. There was also paralysis of the extensor muscles of the wrist, showing that the musculo-spiral nerve had been injured.

I saw the patient three days later and had the X-ray photograph (Fig. 3) taken, which shows a most important feature common in fractures and other injuries at the lower end of the humerus, viz. the lower end of the upper fragment projects forwards and prevents flexion of the elbow beyond a right angle. If the fracture is allowed to heal with this displacement uncorrected, a very awkward impairment of function results, it being impossible to bend the elbow beyond the rectangular position. When once solid repair has taken place it is difficult to remedy the defect; practically all that can be done is to remove the projecting lower end of the upper fragment, and this does not always give a very satisfactory degree of improvement. In some cases excision of the joint may be required. The question arises, How is impairment of function to be avoided in cases of this kind? The directions given in the older text-books are such as make a bad result certain; thus in a well-known text-book published in 1884 the following directions were given as applicable to all fractures about the elbow-joint: "After the subsidence of the swelling, the fractured bone, whatever be the precise nature of the injury, is best maintained in position by being put in an angular splint applied to the inner side of the limb." One of the results of the study of fractures by the X rays has been to show that this advice was wrong. The safe rule to follow in cases of fractures of the lower end of the humerus with backward displacement of the distal fragment or fragments is to put up the limb with the forearm supinated and the elbow fully flexed.* In the case now under consideration the musculo-spiral nerve was injured, and, although the X ray (Fig. 3), having been taken from the side only, shows a single lower fragment, there was really a T-shaped fracture, as Dr. Hull had diagnosed. In these cases joint-stiffness is sometimes an inevitable consequence of the injury; therefore I decided to operate with the double object of wiring the fragments together and examining the condition of the nerve. I felt also that after wiring it would be safe to begin passive movement earlier than if the fragments were left unattached. Accord-

ingly on September 25th, I made two incisions, the first over the lower part of the musculo-spiral nerve, beginning at its point of perforation of the outer intermuscular septum. Having ascertained that the nerve was not caught between the fragments, I made a second incision vertically at the inner part of the back of the arm along the inner border of the triceps tendon, ending below at the inner angle of the olecranon, care being taken not to injure the ulnar nerve. Through this incision I exposed the fractured surfaces which were seen

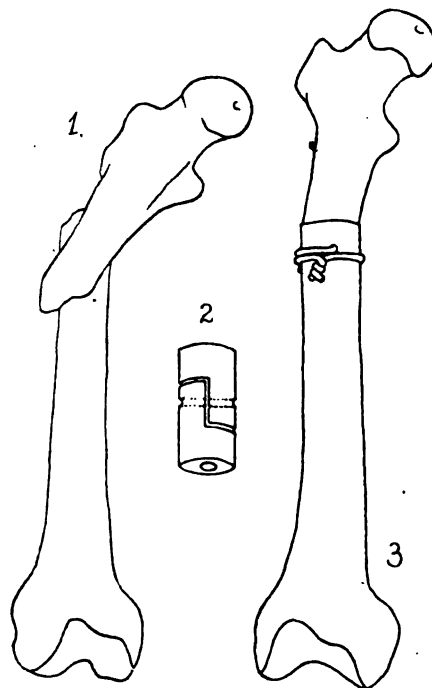


FIG. 2.—1 represents the fragments seen from the front before operation; 2, diagram representing the tenon as seen from the side, the interrupted line showing the drill-holes; 3, the re-integrated femur seen from the front.

when some tar-like blood had escaped and the wound had been well irrigated with sterile salt solution. One narrow fragment comprising the lower part of the outer border of the shaft of the humerus was completely detached and was removed. The fracture was then found to be a T-shaped one into the joint. The inner fragment was secured by wire to the corresponding part of the shaft of the bone. The wound was again washed with saline solution and then thoroughly dried. The wounds were then closed except the lowest part of the inner one, which was left open for drainage.

* I have used this method for some years past. In a recent number of the CLINICAL JOURNAL I see that Mr. Robert Jones says that he initiated the practice, and I am glad to be able to attribute it to so capable a surgeon.

The limb was then put up with the elbow fully flexed and retained by a malleable metal splint applied to its posterior surface. At the end of a week the stitches were removed, normal repair having taken place without pain. A fortnight after the operation gas was administered and gentle passive movement at the elbow was done. After this the splint was removed daily and the patient encouraged to make slight active movements of the elbow. In order to encourage the return of power

the rectangular position, with a result that would leave very much to be desired.

Whether in any given case of this kind it would be best to cut down and wire the fragments must depend upon circumstances. If the fracture is unaccompanied by any complication, such as injury to the musculo-spiral nerve, and the swelling is not extreme, the limb may be put up at once with the elbow fully flexed, dusted over with boric acid powder, enclosed in cotton-wool, held in place



FIG. 3.—Skiagraph of the bones about the elbow in a case of T-shaped fracture of the humerus, lateral view.

in the extensor muscles of the wrist, the latter was kept in the hyper-extended position. Electricity was also applied by Dr. Hall, but it was not until December 7th that the power of the extensors began to return; meanwhile the active movements of the joint had been improving daily, and the result has been a complete restoration of the powers, functions, and form of the limb.

This case is particularly instructive, since those practitioners, who remember what until recently they were taught, might easily put up such a fracture in

by a bandage, and the whole encased in plaster of Paris, whether as a Croft's splint or in the form of bandages passing round the patient's neck and the wrist of the damaged arm. When, however, all the requirements of aseptic surgery can be fulfilled, I think in cases of T-shaped fracture there are advantages in incising and examining the parts, clearing away the effused blood, and wiring the fragments together. The patient is thus saved much pain and tension in the injured part, and the risk of ankylosis or limit-

ation of movement in the joint is lessened by enabling the surgeon to begin passive movement earlier than would otherwise be free from the risk of causing a false joint. In less severe injuries to the lower end of the humerus, e.g. separation of the lower epiphysis, the position of complete flexion of the elbow will still be the best, but in such an injury there is nothing to gain by open operation.

Separation and comminution of the head of the radius.—Emma —, æt. 32 years, admitted to the City Orthopædic Hospital, March 1st, 1901. Several months previously she had fallen with her bicycle, injuring the right elbow. She attended a hospital, when the limb was bandaged and put in a sling; subsequently, at another hospital, massage was applied for five weeks without material benefit. On examination, the elbow was found to be flexed to a right angle, and passive movement was possible only a few degrees from this in the direction of flexion and extension, this small amount of movement causing pain. The forearm was pronated and the patient was unable to make any voluntary movement towards supination, and passive movement was extremely limited and very painful. The patient also experienced a good deal of pain in the course of her daily life. A skiagraph was taken, and it showed that the head of the radius had been broken off and separated into two fragments, one of which lay in front of the joint against the lowest part of the capsule; the other was seen to be wedged between the neck of the radius and the humerus. Operation on April 15th. I made a vertical incision, exposing the olecranon process, and separated it by chiselling through its base. On drawing up the detached olecranon half of the radial head was seen in the joint cavity attached on all sides by fibrous adhesions. After removing this segment and breaking down the resisting adhesions, I found that the joint could be both flexed and extended and pronated and supinated easily, the neck of the radius being seen to rotate during the latter movements. I felt it would entail a considerable amount of straining of the joint to remove the other fragment of the radial head which lay at the front and lower part of the joint, and I decided to leave it since movements of the joint had been made free by removal of the other fragment. The joint having been kept quite free from blood by careful

use of aseptic swabs, the olecranon was re-attached by two silver sutures and the wound closed. A week later the dressing was changed and the stitches in the skin removed, and passive movement begun. A fortnight after the operation the patient began to exert active movements which for some time were assisted by massage. She left the hospital on May 15th, having already a useful degree of all movements at the elbow. I saw the patient three years after the operation, and her right arm was quite as useful and strong as the left. A very slight impairment consisting of a trifling diminution in the power of completing the movement of supination was all that remained of her previous disability; the forearm moves well through somewhat more than 135° instead of the full 180° of the pronation-supination movement.

The only reflection that can be made on this case is the somewhat obvious one that in every instance of permanent stiffness in a joint following injury a good skiagraph should be made to constitute its due share of the basis of surgical treatment.

“SYPHILIS in the Sudan is a loathsome scourge. In the time of the Dervishes it was considered rather an honour to have acquired infection. A lad was not a man till he had developed a chancre. The results of this ignorant and pernicious *régime* are deplorable. Patients do not visit the hospitals till they are masses of ulceration and necrosis. True, they make use of tureba, a native preparation of mercury found locally, and they even fashion cones for fumigation with it, but their treatment is not conducted on sound principles and is probably more harmful than beneficial. Education, combined with proper sanitary measures, is the only remedy. The Sudanese are fond of their children, and if they could be made to understand how frequently they are themselves to blame for the pitiable condition of their offspring, be taught the dangers and crippling effects of the unchecked disease, and be instructed how to avoid acquiring it and how much can be done by proper treatment when it is acquired, a great step would have been taken to ameliorate their sad condition.”

The above is from Dr. A. Balfour's first Report from the Wellcome Research Laboratories at Khartoum. The Report is an extremely interesting record of how medical scientists help to make Empire.

A CLINICAL LECTURE
ON
CYSTOSCOPY
AS AN AID TO DIAGNOSIS IN
URINARY SURGERY.*

By J. W. THOMSON WALKER, M.B., F.R.C.S.,
Assistant Surgeon to the North-West London Hospital,
and to St. Peter's Hospital for Stone and
Urinary Disease.

GENTLEMEN,—I do not intend to weary you with a formal lecture on the mechanism and use of the cystoscope. Such theoretical knowledge you can gain from text-books. I shall merely introduce the subject with a few practical remarks before showing you some cases which I hope will interest you. You will sometimes hear it said that the cystoscope is a useless and even a dangerous instrument. Let me therefore say a word in regard to the necessity for cystoscopic examination in urinary surgery.

The cystoscope as a means of localising urinary disease.—I can best illustrate the use of the instrument by relating a case in point.

S. D—, a young man æt. 34 years, attended my out-patient department at St. Peter's Hospital in May, 1903. After lifting a heavy weight he suddenly noticed that his urine was coffee-coloured. At the same time he began to have increased frequency of micturition, varying from one and a half to two hours during the day, and he sometimes rose once at night. This had continued for fourteen days before I saw him. The bloody urine became bright red while under observation. The blood was in considerable quantity and varied very little in amount; it was well mixed with the urine, and there were no clots present. Seven years before he had had a similar attack, lasting seven weeks. He had no pain, and apart from the hæmaturia and frequency of micturition was in good health. There was nothing to be made out on rectal examination or on palpation of the abdomen.

How were we to make a diagnosis in this case? In the first place, apart from the ultimate cause of the bleeding, was the source of the blood the bladder or the kidney, and if the latter, which

kidney was the seat of the trouble? What signs had we to help in diagnosis?

The colour of the urine varied from a bright red to a dark porter colour. We know that bright blood usually comes from the bladder, but we also know that in copious bleeding, such as was here present, bright blood may come from the kidney or its pelvis. Again, the appearance of the blood at the commencement or at the end of micturition as signs of prostatic and bladder disease have no application in a case such as this, where the urine was bloody from start to finish. These signs apply only to slight hæmorrhage: they are worthless in severe hæmorrhage. Intimately mixed blood and urine comes from a renal source you are told. This sign is of very doubtful value, and again only applies to small quantities of blood in the urine. The presence of clots is sometimes an aid to localisation in these cases, for long worm-like coagula are typical of ureteral clotting. No clots were present in the urine in this case, a condition which you will often have to face. The bleeding was too copious to expect a search for tube casts to be successful, and none were found.

Were there no localising symptoms which might point to kidney or bladder disease?

Pain was absent, but there was definite frequency of micturition commencing at the same time as the hæmaturia. This might point to bladder disease did we not know that where blood is present in large quantities in the urine it causes sufficient irritation to the bladder mucous membrane to cause frequency of micturition. Had the frequency of micturition preceded the hæmaturia we would have had a valuable sign of bladder disease, but it commenced at the same time as the bleeding, and was therefore worthless as a localising symptom.

You will see, therefore, that we had nothing to guide us in the symptoms. What further means might we have adopted to make a diagnosis apart from cystoscopy?

The bladder should be sounded, you may say. I did not sound the bladder, as I intended to cystoscope, but suppose I had I should have felt nothing. How much nearer a diagnosis should we have been then? We knew already from his symptoms that he had no stone in his bladder; stone in the bladder is not accompanied by furious painless hæmaturia.

* Delivered at the Medical Graduates' College and Polyclinic.

Use the catheter and fish for pieces of growth which will be left in the eye of the instrument, you might suggest. In this case you would have failed to catch a piece of growth. Could you then have said that there was no growth in the bladder? Certainly not. The dragging away of one of the fimbriæ of a villous growth in the eye of a catheter depends upon chance, and, I believe, occurs usually in large villous growths which are beginning to necrose. Inability to fish out a piece of growth is worthless as a point in diagnosis.

The X rays might, of course, have been used, and in this case the result would have been negative. What is the value of a negative X-ray photograph? Unfortunately, it is of comparatively little value. We can usually exclude a large renal stone, but small stones, especially those composed for the most part of phosphates, frequently give no definite shadow. The X rays are useless in the diagnosis of small stones passing down the ureters.

How are we now to proceed? Exploratory operation is the next step which is usually suggested. But where are we to begin? Suppose we had opened the bladder above the pubes in this case. Do you think it is an easy matter to search a collapsed bladder thoroughly where there is the possibility of a small papilloma or ulcer? By no means. And when you had excluded bladder disease after a prolonged search you would then have to try and find the openings of the ureters to ascertain from which the blood was coming, and you would be astonished to find how difficult this is in practice although it seems perfectly simple in theory. I have not considered the perineal route, for only a very small area of the bladder base can be explored by the finger from the perineum, and that not very thoroughly.

If the case had been a woman, you might have suggested a digital exploration by the urethra. But, gentlemen, you have only once to explore the female bladder in this way to realise how the finger is gripped by the urethra, how little of it gets inside the bladder and how indefinite is the information obtained, and you need only meet one case of chronic urinary incontinence resulting from the exploration to convince you that the method should only be used if no other is available.

In the case I have related you might have decided to cut on one of his kidneys. But which?

Let me interpolate another case to show you what might happen.

A. B., æt. 27 years, came under my observation in July, 1903, with severe hæmaturia. There was the scar of a kidney operation in his left loin and he gave the following history. In October, 1902, hæmaturia suddenly appeared and continued without intermission until December, when he was examined by a surgeon, who very kindly gave me full details of the case. At that time the urine was of a deep porter colour and contained a few worm-like clots. Occasionally a few oxalate crystals appeared in the urine, he had intermittent slight pain in the back, which was rather more marked on the left side and the left loin appeared to be slightly more rigid.

On these symptoms the left kidney was explored, but no stone or tumour was discovered. The kidney was somewhat damaged in the exploration and was removed. Microscopic examination showed that no nephritis was present.

During convalescence from the operation a sharp attack of hæmaturia occurred and lasted for four days. The hæmaturia ceased for some weeks and then returned and continued until I saw him. On introducing the cystoscope, blood was seen issuing from the right ureter in bright jets. The bladder was normal. I hesitated to cut upon this single kidney and he remained in bed for some weeks under hæmostatics. The bleeding diminished slowly and the urine became clear and the patient decided to postpone the exploration of his kidney. I have heard recently from his doctor that he is fortunately still in good health, although he has bled once or twice since I saw him. It was evident that the healthy kidney had been cut upon. Unfortunately, it was removed and the man is now dependent upon one diseased kidney for his existence. Cystoscopy would have saved this healthy kidney.

You will see, therefore, that the cystoscope should take the place of certain exploratory operations, either on the bladder or the kidney, the primary object of which is the localisation of the disease.

In the case I described to you at the commencement of my remarks, the cystoscope showed at once that the bladder was healthy and blood was seen pumping from the left ureter. I afterwards cut on his left kidney and found it free from

stone tubercle and growth. A slice that I removed showed patches of chronic nephritis, and the case was one of those obscure cases of slight chronic interstitial nephritis which appear to be confined to one kidney and only affect patches of the kidney cortex. The bleeding, as is usual in such cases, ceased after the exploration and has not recurred.

I think I have said sufficient to convince you that the cystoscope is necessary in many cases for the localisation of urinary disease.

The cystoscope as a means of diagnosis.—Having localised the disease to the bladder or to the kidney, the next step will be to diagnose the form of disease present.

In disease of the bladder the cystoscope finds its widest application, but information may be gained by examination of the ureteral openings, which gives important evidence in regard to the condition of the ureter and kidney pelvis, and the function of the kidney itself. This latter sphere of usefulness of the cystoscope belongs to advanced cystoscopy, and I shall not detain you by enlarging upon it. I shall not attempt to describe the cystoscopic appearances of the various bladder diseases to you to-day; for even if your patience were sufficiently elastic to bear the strain, the mere word pictures would teach you nothing, and the time at our disposal would not cover even a bare outline.

You will find that a large number of cystoscopies show that the disease of the bladder is slight and transient. Thus one of the most frequent conditions you will note will be a reddened, puffy, irritable-looking bladder base, and the rest of the bladder mucous membrane healthy. Cystoscopy in these cases you may think has told you little. But you must not forget the importance of negative evidence. These attacks of slight basal cystitis often resist treatment or recur time after time, and you will begin to doubt whether the beak of your sound—for you have of course sounded the bladder—may not have missed a small stone lying behind the trigone or in some fold of the bladder mucous membrane. It is not a difficult matter to miss such a small stone with the sound, and in one case I returned to the sound after cystoscopy in order to try if I could touch the tiny calculus I had seen, but once more failed, although I now knew in which part of the bladder it lay.

Further, you will have excluded by your cyst-

oscopy in these cases early tuberculosis of the bladder. The symptoms in both cases are very similar.

The presence of tubercle bacilli in the urine is, of course, conclusive evidence; but you must remember that the detection of bacilli in the urine is the work of an expert, and not to be undertaken in a haphazard fashion, and experience will show you that the tubercle bacillus is only found in a certain percentage of cases of tuberculous disease of the urinary organs.

I am afraid to give you exact numbers taken from my own cases lest I may lead you to distrust unduly this valuable means of diagnosis, but you may accept the statement that in a considerable number of undoubted cases of tubercular disease of the kidneys or bladder, tubercle bacilli are not discovered in the urine even after several examinations by an independent expert. You see, therefore, that too much importance should not be placed on the negative result of examination of the urine for tubercle bacilli.

There are many other conditions in which the diagnosis may rest entirely upon cystoscopic examination, but I will only remind you of two forms of stone which may be beyond the reach of the sound and yet be seen by the cystoscope—namely, stones lying in a saccule of the bladder and those lying behind a large intra-vesical projection of a prostate.

Recently I removed a very large collection of pea-sized stones from behind a large prostate. These stones were apparent in cystoscopy, but I was quite unable to touch them with a sound.

The cystoscope as an aid to operation.—There is another branch of this subject to which I shall only make a passing reference. The cystoscope affords valuable information to the surgeon in regard to operations in bladder disease.

The few malignant tumours of the bladder which are operable are situated towards the apex of the organ away from the ureters and base, and these may be delimited before operation by the cystoscope.

In papillomata of the bladder the tumours are often multiple and some of them minute. These tiny papillomatous buds are easily passed over when the bladder is opened, as they become hidden in folds of mucous membrane. If, however, the cystoscope has been properly used before

operation, a note of the number and position of the tumours is at hand to guide the operator and to insure a complete and rapid operation.

Again, in enlarged prostate the presence of a well-marked intra-vesical portion is a very important aid to the operator performing prostatectomy, and sometimes the question of operation will depend upon the presence or absence of an intra-vesical projection. The cystoscope is the only certain means of estimating the presence of an intra-vesical projection of the prostate without opening the bladder, unless the mass is of such considerable size as to be palpated bimanually.

Where the intra-vesical projection consists of two lobes, the cleft between them is readily seen on withdrawing the instrument, so that it lies just inside the internal meatus. Where a large collar projects into the bladder, the edge may appear smooth and unbroken, but the cystoscope must be pushed far in before a view can be obtained and the relation of the edge of the opening to the ureters and interureteral bar will show you that the collar projects far back on the bladder base. Sometimes the ureteral openings are hidden from view behind a large collar-like projection of the prostate.

The diagnosis between simple and malignant enlargement of the prostate is of vital importance where prostatectomy is proposed. Rectalexamination is often sufficient to distinguish between these two conditions; but the diagnosis is frequently very difficult, and no point, however small, should be neglected in trying to come to a decision.

Cystoscopy sometimes helps in the diagnosis. The intra-vesical projection in a malignant growth is usually more opaque than an adenomatous ingrowth, but mere opacity is not sufficient evidence on which to base a diagnosis. An irregular outline is more important, for the non-malignant intra-vesical projections are smooth and regular.

I was able in one case to settle a doubt as to the malignancy of a prostatic enlargement by finding at the vesical meatus an opaque slightly irregular margin with angular-looking projection at one part.

The dangers of cystoscopy.—Are there, then, no dangers to avoid or difficulties to overcome in using the cystoscope?

The danger of cystoscopy frequently lies, not in the instrument itself, but in the cystoscopist. The passage of any instrument along the male urethra has an accompanying risk, firstly, of shock, and

secondly, of sepsis, and the danger reaches its maximum with a surgeon who has confidence without skill. Any surgeon who has taken the trouble to train himself in urethral work, and who recognises the importance of delicacy of touch and cleanliness, can use the cystoscope without fear in the same cases and with similar precautions as he would use in passing a catheter or bougie.

Burns of the bladder mucous membrane with the cystoscope lamp are almost always the result of inexperience or carelessness.

It sometimes happens that in demonstrating a cystoscopic view to a number of onlookers the lamp is allowed to touch the bladder wall but apart from this the position of the lamp is guided by the eye, and is always surrounded by sufficient fluid to diffuse the heat.

Recently Lowenstein of Berlin has introduced a "cold lamp" which gives off almost no heat, and may be used with perfect confidence.

There is a danger in regard to the cystoscope which attends the use of all specialised modern methods of diagnosis—the danger of rushing too precipitantly to the use of the instrument before exhausting the ordinary means of investigation.

Let me relate the following case as a warning to you to examine your cases carefully before asking for a cystoscopic examination.

I was asked recently to cystoscope a young unmarried lady who had suffered for five years from frequency of micturition and slight pyuria, and was assured that all other systems were normal.

I saw the patient on the operating table while she was being anaesthetised and at once proceeded to the cystoscopy. The bladder filled badly, as I expected, and only held a few ounces. On introducing the cystoscope, I was struck with the peculiar shape of the bladder; at the base and posterior wall there were some small areas of inflammation which closely resembled those seen in early tubercular disease. The changes were not typical and did not seem sufficiently extensive to explain the long duration and the severity of the symptoms and I was dissatisfied with the cystoscopy. On making a rectal examination, to my astonishment I found a large cyst occupying the whole pelvis and extending up nearly to the umbilicus. I afterwards removed a large ovarian cyst which had filled the pelvis and crushed the

bladder downwards and forwards and the patient completely lost all her bladder symptoms.

The difficulties of cystoscopy.—The cystoscope, like the ophthalmoscope and the laryngoscope, requires practice and study before it becomes a really trustworthy and useful instrument. You will probably be astonished at the ease and clearness with which you can distinguish, say, a stone or a papiloma on the first occasion it is demonstrated to you, but when you begin to use the instrument yourself you will find that the difficulties in interpreting what you see are many and varied. There are, of course, cases in which the cystoscope is useless. A large growth may fill the bladder and the cystoscope may plunge into this; a prostate may be so large that the beak of the cystoscope never enters the bladder at all; the bladder may be in a state of constant spasm from tubercular disease, or contracted round a stone, so that it cannot be distended with fluid. These cases do not, however, require cystoscopy for diagnosis.

Your most frequent difficulties will arise from blood or pus and *débris* rendering the medium opaque, or from spasmodic contraction of the bladder. Bleeding will usually be overcome by washing with very-weak nitrate of silver, and sometimes with adrenalin, although I admit the latter is rather disappointing as a bladder hæmodynamic. The most difficult bleeding you will have to deal with in cystoscopy is the slight persistent oozing which often occurs when you distend a tubercular bladder with fluid, and that arising from the mucous covering of an intra-vesical nodule of enlarged prostate which recurs in each introduction of the instrument after re-washing; and you may have to abandon the cystoscopy and return it on some other occasion.

Pus and *débris* often require patient and repeated washing before a good view of the bladder is obtained. Even profound anæsthesia does not relax the spasm of a contracted bladder, and where this is present you will probably have to be content with what information you can gain from examining a bladder containing three or four ounces of fluid, or give up the attempt and rely upon other methods for your diagnosis.

ORTHMANN'S HANDBOOK OF GYNÆCOLOGICAL PATHOLOGY. (Bale, Son and Daniellson. London, 1904.)

Dr. Hubert Roberts has rendered the serious student of gynæcology a great service in translating Orthmann's excellent *vade mecum* into English. It is a striking sign of the times that even those who study pathological histology find it necessary to direct their energy to the investigation of particular sets of organs, or, in plain words, to become specialists.

We have looked carefully through the book, and can recommend it as a safe guide whether in the matter of the preparation of the material and the technique of staining and section cutting, or in the brief descriptions of the microscopic appearances of the diseased tissues aided by admirable illustrations. The book is a good example of what a student's book should be, the different conditions being considered equally, and no special disease treated at great length to the detriment of another. The book is also valuable to those who are interested in such lesions as kraurosis vulvæ, sarcoma of the Fallopian tube, the various forms of malignant disease of the genital tract from the vulva to the ovary, including the dread disease deciduoma malignum.

A COPY of the new edition of the 'Student's Handbook of Surgical Operations' by Sir Frederick Treves has been received for notice from Cassell and Co. This new edition has been revised by the author and Mr. Jonathan Hutchinson, junr. As is well known, this handbook concerns itself only with the most essential and most commonly performed operations. All matters, save such as deal with the actual technical details of operative surgery, have been omitted. The work is intended for the use of students who are preparing for the final examinations, or who need a handbook to assist them in carrying out operations upon the dead body. The general principles of operative surgery are not discussed, and after-treatment is not entered upon. The only plastic operations described are those concerning the common deformities of the lip and palate. The volume is so well known that it does not require a long notice.

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ALCOHOLIC MULTIPLE PERIPHERAL NEURITIS.

A Clinical Lecture delivered at Guy's Hospital.

By W. HALE WHITE, M.D., F.R.C.P.,
Physician and Lecturer on Medicine, Guy's Hospital.

GENTLEMEN,—The young woman you see lying before you came into the hospital this week complaining that she could not walk and that she had pains in her limbs. On examining her we found that she had lost also the power in her upper extremities, and you can see for yourselves how weak she is in both her arms and legs. Clearly, therefore, the first problem we have to solve is, What can be the cause of loss of power in all four limbs?

Now, the cause cannot be any organic disease of the brain except general paralysis, for if it were we should expect her to have hemiplegia rather than paraplegia. She is only 26 years old and therefore can hardly have general paralysis; and further, there is no evidence of it. Some of you might suggest the possibility of hysteria; but while hysterical paraplegia is common, it is very rare to find all four limbs paralysed in this disease. Then, too, you should never diagnose hysteria unless you have previously excluded all possible organic causes for the malady.

With regard to the spinal cord, if the symptoms were due to disease of it, it must be disease of the anterior cells because of the extreme wasting; but it would be so excessively rare for all four limbs to be affected that it will be better for us to see whether the disease can be due to an affection of the nerves. Now, you see I can demonstrate to you that the nerves themselves are excessively tender. When I press my fingers in between the toes you notice that she cries out with pain. This is because by so doing I press upon the digital nerves. Then, again, you see I can demonstrate to

you that the external popliteal nerves are tender; and further, when I grip any bulk of muscle, such as that in the calf or the arm, you will notice that with even a slight grip she shows signs of extreme pain. This is because in the gripping I press upon a number of small nerves. So we may conclude that the nerves themselves are tender. Inflammation of the nerves would not only explain this tenderness, but it will account for the loss of power which I have already demonstrated to you; and then we have already in the ward found that she shows a reaction of degeneration. Now, watch me test her sensation. You see that in various parts of her body she has patches of anæsthesia. Over these patches she can feel neither pain, touch, nor differences of temperature. This is obviously explicable on the view that her nerves are affected. Next you notice that she has lost reflex action; however much I try, you see I cannot elicit a knee-jerk. Then we have already noticed the wasting; that too follows on inflammation of the nerves. We may therefore conclude that she has multiple symmetrical peripheral neuritis. This being so, there is no need to discuss the question as to whether her loss of power can be due to disease of the muscles, but I may tell you there is no disease of the muscles known that could account for her symptoms.

This neuritis is called multiple because it affects many nerves, symmetrical because it is always nearly equal in degree in corresponding limbs, and peripheral because it is best seen in small nerves. It is divided into clinical groups according to its causes, and the four commonest causes are alcoholic drinks, lead, arsenic, and diphtheria. Alcohol is the commonest cause in women, so the next thing we have to do is to see whether the patient before you conforms to the symptoms of alcoholic peripheral neuritis. Now the most important thing about all these poisons is that they each have their favourite nerves. Thus, alcohol and arsenic always first pick out the anterior tibial nerves and their small branches, lead the musculo-spirals and their small branches, and diphtheria the nerves of the palate. Why that is so nobody knows, any more than we know why the rash of measles occurs first on the forehead and that of scarlet fever first on the chest.

Let us turn again to the patient. You notice that her feet are dropped; that means that the muscles on the front of the leg are weaker than

those on the back, which again means that the anterior tibial nerve is more paralysed than the posterior, which conforms to the view that she is suffering from alcoholic neuritis. You will see it takes very little pressure to prevent her bending her foot up at all. The second nerve to be selected by alcohol is the musculo-spiral. You notice when I make her hold out her hands that she cannot extend them. She has very strikingly what is commonly known as wrist drop. Next to the anterior tibial and musculo-spiral nerves alcohol selects the other nerves of the limb muscles, and you notice that she is weak in her arms and thighs. On the other hand, alcohol rarely affects the nerves supplying the muscles of the back, neck, face, eyes, throat, tongue, pharynx, and pupils; and as I examine her you will observe that none of these are affected in her case. Further, it is very important to remember that the nerves supplying the sphincters are never affected and she has had no loss of control.

Again, in alcoholic neuritis the reaction of degeneration is very variable, being well marked in some muscles and not in others. This we found to be remarkably true in her case.

In the sensory symptoms of this disease, it is striking that the pains due to inflammation of the nerves come on very early and are very prominent, and you hear she tells you that the pains in her legs have been very severe, and that they were the first symptoms she noticed. Then, again, the pains are always in the limbs, chiefly the legs; and she tells us that these pains came first in the legs and then in the arms, and that even now she has none in the trunk. Further, the pains last some time, and she is still suffering from them. I have already demonstrated to you the tenderness of the nerves. It is especially characteristic of the disease that the small nerves should be very tender, and hence the pain on gripping muscles. Also remember that the pain in the muscles from inflammation of the small nerves is produced by contraction of the muscles as well as by compressing them, and you notice that directly we ask her to move her arms or legs she has severe pain in them. Hyper-æsthesia is an early symptom. She may have had it, but by now it has passed off. On the other hand, it is very characteristic of the disease that the anæsthesia should be patchy, and I have already demonstrated to you that that is so. Loss of the

sense of pain is more common than loss of touch or temperature sense ; but in her, as far as we can discover, she has lost all three equally in the affected patches. I have already mentioned that the reaction of degeneration varies in different muscles, and trophic symptoms are not common in multiple neuritis due to alcohol. She does not show any. We have therefore arrived at the diagnosis that she has multiple neuritis due to an excess of alcohol. Now, let us try and confirm this. I read her report, and you find that her mother says she has given way to spirit-drinking heavily for the last six months. You notice the fatuous look in her face and the flush on the cheeks. Her report tells us that she suffers from morning sickness and other symptoms of indigestion. If you will come and examine her afterwards you will find that she has a large liver which extends two inches below the ribs, is hard and rough, and has, indeed, all the characters of a cirrhotic liver. You notice that she has the thin, delicate skin characteristic of alcohol in excess, and she has a silly manner, apparently not taking in all that we say to her, which is very characteristic of over-indulgence in alcohol. I think, therefore, you will agree with me that the diagnosis is fully confirmed.

I mentioned to you just now that the nerves of the trunk were very rarely affected. So they are ; but affection of two of them, namely, the vagus and phrenic, does occur, and is most important. For it is only by affection of these nerves that alcoholic neuritis can directly lead to death. The affection of the vagus is recognised by a rapid and irregular pulse. Possibly she had some slight affection of it, as her pulse is about 100, but if the vagus is severely affected the pulse is much more rapid than this. Some years ago we had in the hospital within a single month three patients with alcoholic neuritis, all of whom died from failure of the heart and a very rapid pulse due to affection of the vagi. The symptoms of affection of the phrenic need not detain us, for you all know the symptoms of paralysis of the diaphragm.

The most important thing about alcoholic neuritis is to recognise it early, and the early symptoms due to irritation of the nerves by the neuritis are often overlooked. The most common is pain, and this pain is usually set down to neuralgia or rheumatism. Whenever a patient comes to you complaining of neuralgic or rheumatic

pains in the limbs you should always go over the case to make sure that the pain is not due to alcohol. This cannot be impressed upon you too strongly. Many a patient might have been stopped on her downward course if it had been recognised that she was not suffering from chronic rheumatism and neuralgia as she said, but was really affected by alcoholic neuritis. Another early symptom is cramp. These patients often complain of cramps. No doubt it is due to irregular contraction of the muscles produced by the irritation of the neuritis. Numbness and tingling are two early symptoms. Complaints of either of these should always make you suspicious. Sometimes the disease is first recognised because the irregular paralysis of the muscles makes the patients ataxic, and then the malady is particularly likely to be called tabes dorsalis because the neuritis has led to an absence of the knee-jerk. If you will look at the pupils you will avoid this error. Another early symptom very necessary for you to remember is the peculiar gait adopted by these patients before striking paralysis sets in. It is called the high-stepping gait, because they walk with their heels off the ground. The reason for this is that owing to the weakness of the muscles supplied by the anterior tibial nerve those on the back of the leg drag up the heel. Then, again, tremor is an early symptom which may be overlooked ; and lastly, bear in mind that in the early irritative stage the knee-jerk may be exaggerated.

The difficulties of diagnosis are mostly compassed by remembering these early symptoms, and especially in not overlooking the true cause of pains, but they are often made still more difficult by the fact that patients with alcoholic neuritis drink secretly—in fact, so secretly that you cannot get the friends to believe that they drink at all. It is only by the most careful inquiry that you can find it out, and, as you know, I am in the habit of telling you many extraordinary tales of the deception and lying adopted by women to keep their drinking habits secret. When the disease is well established arsenical neuritis is the only disease likely to be confounded with alcoholic neuritis, and in London at least the cause of the arsenical neuritis is usually that the drug has been given as a medicine, so that a little care will prevent a mistake. Do not let attacks of pain in the stomach put you off your guard ; patients often complain of

such pain in the hope that they may be given brandy for it.

We pass now to the prognosis, and unless the vagus or the phrenics are badly affected this is good, provided that the patient will give up her evil habits. But you must be very careful to avoid the contracture that follows upon unequal affection of the muscles. Owing to this unequal affection the joints get fixed in one position, adhesions form, and it may take a long while before you can get the limbs straight. All this can be prevented by massage and passive movements. The patients should always be put to bed and kept at rest. They are much better without any drug to relieve the pain, which usually soon passes off if they keep quiet. Do not on any account give them morphia; if you do they will probably take it to excess, and then they are worse off than when they took alcohol to excess. During the acute stage do nothing to the muscles. When the tenderness has passed off gentle massage, passive movements, and the application of the faradic current, all help to restore the muscles. Drugs are usually quite unnecessary, but sometimes benefit follows small doses of strychnine subcutaneously.

The disease comes on after excess in any kind of alcoholic drinks, and it is generally assumed that the alcohol itself is the offending agent. But this is by no means proved, for the malady cannot be successfully reproduced by giving absolute alcohol to animals; and the outbreak a few years ago of a large number of cases in Manchester showed that sometimes at least the symptoms may be due to other causes than the alcohol, for in these cases it was demonstrated that the arsenic which contaminated the beer was the cause of them. The disease is equally common in men and women, but inasmuch as probably fewer women drink alcohol to excess than men it is proportionately commoner in women, and certainly the worst cases are seen in women. It has been suggested that the reason for this is that many a man pulls himself together when he is drinking because he finds that if he does not give it up he will lose his means of earning a livelihood, but this is not operative in many women. It is mostly seen between the ages of 30 and 50.

You will find scattered in medical literature many accounts of paralysis due to excess of alcohol. There was a very good one written over a hundred

years ago by Lettsom, but this form of paralysis was not generally recognised until Sir Samuel Wilks taught in his lectures that alcohol was a frequent cause of paraplegia. Even then it was not known that it was due to neuritis. But that the disease was recognised as a clinical entity can be easily proved by my reading to you the account given by Sir Samuel Wilks when he used to lecture to your predecessors: "Of course, drunkards of all descriptions suffer from muscular and nervous weakness, but, as I before said, it is more especially in the legs that the effect is most striking. A loss of power is first observed, accompanied by pains in the limbs, and in some cases by anæsthesia. . . . I occasionally see in this neighbourhood a publican's wife, who commenced business two years ago, previous to which time she was temperate and well. Since this, the constant presence of gin before her eyes has been too much for her, and she has drunk the burning liquid in enormous quantities. This could not continue long with impunity, and now she has been confined to her bed for six months. She is almost paralysed, having very little power to move her limbs, is not able to raise the heel from the bed, and has no power to grasp with the hand; the muscles are flabby, and she has almost complete anæsthesia; the mind is also somewhat enfeebled. Now and then the arms are affected, and occasionally anæsthesia is the principal symptom. This may affect one side only. Such cases I could multiply to any extent. Several I have seen end fatally, and in some a partial recovery has taken place. A most remarkable case is now under my care. A lady æt. 35, married, but without family, being left alone all day, had been secretly drinking, until at last she became perfectly paralysed in mind and body. She took to her bed and her end was shortly expected. She was sallow, wasted, quite unable to move her legs, and her arms but slightly; she appeared to have lost feeling also in the lower extremities. She had become almost fatuous, scarcely recognised her friends, and, indeed, her mind was a blank. All alcohol was at once stopped, a nurse was procured and feeding commenced. She slowly recovered, and now, after five months, is able to walk and come to my house, having grown stout and regained her intellect. Another woman, who could not be managed at home, recovered speedily after going to a hydro-pathic establishment."

INFANT FEEDING, WITH SPECIAL REFERENCE TO THE HOME MODIFICATION OF COW'S MILK.

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THE subject of infant feeding is yearly becoming one of increasing national importance, partly because with a steadily diminishing birth-rate it is the more necessary to take as much care as possible of the children who are born, and partly because, under modern conditions of life, an ever increasing number of mothers, in all classes of society, are unable, or if able are unwilling, to suckle their children; and there can be no question that any physical deterioration which is taking place in the inhabitants of this country is very largely indeed due to improper methods of artificial feeding.

Breast-Feeding.—It is desirable to deal briefly first of all with breast-feeding, as if available it is by universal consent the method which should exclusively be recommended during the first few months of life, provided, of course, there is no special contra-indication. No perfect substitute for human milk for the human infant has been, or is likely to be, discovered. Assuming that the mother has sufficient milk, the essential for success in breast-feeding is regularity, and especially the avoidance of the pernicious habit of putting the child to the breast merely because he cries. A baby's meals should be as regular as those of an adult, although of course more frequent. Some such table as the following (from Holt's 'Diseases of Infancy and Childhood') should be adhered to.

Age of child.	Number of feeds in 24 hours.	Interval between feeds during day.	Number of feeds during night (9 p.m.—7 a.m.).
1 month	10	2 hours	2
2-3 months	8	2½ "	1
4-5 "	7	3 "	1
6-9 "	6	3 "	0

After the first month an interval of six hours may be allowed at night.

Circumstances which may alter the character of

human milk.—The following are the most important: (1) Mental emotions, especially perhaps anger and excitement. These may so affect the milk as to give rise to serious gastro-intestinal disturbance in the child. (2) Over-feeding (particularly with nitrogenous food), especially if combined with insufficient exercise, may largely increase the fat and proteid in the milk. Alcohol often has a similar effect. (3) The state of the general health—for instance, anæmia or want of rest—may seriously lower the quality of the milk. (4) Menstruation and pregnancy. As a rule the former exercises no influence on the milk, but the supervention of pregnancy during lactation often causes its quality to deteriorate, so that the child may begin to lose weight instead of gaining steadily as before. (5) Drugs. Various drugs if taken by a nursing mother may be excreted in the milk, although to a very uncertain and variable degree; so that this excretion should never be relied upon as a means of administering medicine to the child. The more important drugs which may thus appear in the milk are: opium, belladonna, the saline aperients, iodides, bromides, and alcohol.

Weaning.—As a rule a child should be weaned not later than the ninth month and preferably not at the hottest time of the year. It is, however, a most important gain if a mother can only suckle her baby for the first three or four months, as the younger the child the greater the difficulty in artificial feeding. Weaning should always, if possible, be a gradual process, and it must be remembered that a child who has been breast-fed is not likely at first to be able to digest so concentrated a cow's milk as one of the same age who has been successfully brought up by hand, but requires food suited for a hand-fed child a few weeks or months younger. With proper care, however, the weaned child will in a very few weeks catch up to the artificially fed one.

Circumstances under which breast-feeding is inadmissible.—(1) If the mother is suffering from tuberculosis in any form. Under such conditions not only is the strain of suckling most injurious for the mother, but if she has lung disease the danger of infection for the child is considerable. I have made autopsies on four infants who died under the age of seven months from pulmonary tuberculosis, almost certainly contracted after birth. Two of the mothers had already died from that

disease, and a third was seriously ill with it. (2) If the mother is suffering from any serious chronic organic disease, or from a marked degree of debility and anæmia. (3) If the mother should suffer from any acute illness lasting more than three or four days. (4) If, in the absence of any removable cause, the mother has been unable to suckle the two preceding children, it is hardly worth while for her to try to nurse a third, as the attempt is only likely to result in loss of valuable time, and perhaps in a serious diminution in the infant's strength before artificial feeding is commenced. (5) In some cases the mother has practically no milk from the first.

Indications that the supply of breast milk is insufficient either in quantity or in quality.—(1) Fever. This is a valuable sign of starvation during the first few days of life, as has been pointed out by Holt. The temperature may rise to from 101° to 104° , or even higher. The infant must, of course, be carefully examined in order to exclude other possible causes of pyrexia. (2) The weight. Throughout the whole period of lactation this is the most important test of the sufficiency of the mother's milk. Roughly it may be said that an ordinary healthy baby should gain about four ounces a week during the first year of life; perhaps a little more than this during the first six months and a little less during the second six. Many strong, healthy children undoubtedly gain more quickly than this, but about four ounces should certainly be regarded as a minimum for a healthy child of average weight at birth, and a weekly gain less than this for which no other obvious cause can be found almost certainly indicates a deficient supply of food. (3) Habitual fretfulness and restlessness of a child fed exclusively and regularly on breast milk suggest that he is not getting sufficient. The possibility that the milk is too rich and consequently disagrees must be considered, but the distinction is rarely difficult. (4) The character of the stools. If a child is insufficiently fed, these are commonly scanty, hard, and dry. Occasionally there is diarrhoea, with later on possibly passage of mucus. (5) The way in which the child takes the breast may afford some guidance. If the quantity of milk is insufficient, he may continue to suck for half an hour or more, or may fall asleep while suckling; at other times after a futile attempt he may refuse the breast altogether.

When a child is obviously getting insufficient milk from the mother, and nothing can be done to improve her supply, the measures to be recommended depend partly upon the social position of the parents. If the infant can be brought up by hand on thoroughly satisfactory lines, he had better be weaned forthwith; but if bottle-feeding is likely to be negligently carried out, and especially if it should be the hot season of the year, it is desirable, if possible, to retain the breast milk as a reserve in case of emergency, and to feed the child only in part on artificial food. There is a tradition, probably quite unfounded, that cow's milk and human milk do not agree when taken consecutively; the real difficulty is that if the child finds he can get milk from the bottle considerably more easily than from the breast, he is likely to refuse the latter altogether.

Wet-Nurses.—When a mother cannot suckle her own child, the most thoroughly satisfactory substitute so far as the infant is concerned is a wet-nurse, but in this country they are now rarely employed. The social objections are obvious, and the moral question, as to what is likely to become of the nurse's own baby, is not an unimportant one, for clearly she cannot nurse two children at the same time. Moreover during recent years the mothers who do not nurse have become so numerous that a sufficient number of wet-nurses could not possibly be obtained to supply the deficiency, and, as a result, the methods of artificial feeding now in vogue are much superior to those of a few years ago. However, in a few cases of very delicate, feeble, or premature infants a wet-nurse may still be almost essential, if she can be afforded.

It is of course all-important that both the nurse and her child should be perfectly healthy as far as can be ascertained. It is also desirable that there should be no great disparity between the age of her own child and that of the one she is to suckle; this point is, however, chiefly of importance when the latter infant is only a few weeks old.

Artificial Feeding.—A few years ago the artificial feeding of infants was a comparatively simple matter: it was considered sufficient to dilute cow's milk more or less with water, to add an uncertain quantity of cane-sugar, and that was all. As an alternative condensed milk was given, a plan which commended itself by its simplicity and cheapness.

As the need for artificial feeding has become greater more precise and carefully thought-out methods have been adopted, until now the tendency is perhaps to go too far in this direction. By all means let neither time nor trouble be spared in preparing the food of children to whose parents time and expense are no object. We must remember, however, that these conditions do not apply to the vast majority of children who have to be brought up by hand, and that methods which by reason of their very simplicity are likely to be thoroughly carried out may, although by no means theoretically perfect, prove more generally satisfactory than more elaborate and scientific processes, which are only too likely to be carried out imperfectly, if at all.

There is also, I think, a tendency to lay down too hard and fast rules for infant feeding, forgetful of the fact that rules can only deal with averages, and that the most astonishing variations are met with in the digestive powers of children. Not only have we to consider the child's age, but also his weight and, often most important of all, his digestive capacity, which may be largely a matter of inheritance, or may depend upon the way he has been fed before coming under medical care. It cannot be too widely recognised that the digestive capability of infants differs at least as widely as that of adults. We meet with children who thrive upon what appears to be a most unsuitable dietary, whilst others brought up with every possible care and precaution constantly suffer from indigestion. The standard for babies of the hospital class is often quite misleading for those of well-to-do parents. I have seen the child of a medical man obviously half-starved, whilst being fed strictly according to the directions in a manual of diseases of children, and begin to improve at once when the quantity of food given was nearly doubled.

It may be taken for granted that fresh cow's milk should form the basis of the food for the vast majority of hand-fed children. It will be most convenient, therefore, first to discuss the differences which exist between this and human milk; secondly how these differences are to be dealt with in order to render cow's milk suitable for the human infant; and, thirdly, what other foods may be used either in place of, or more probably in addition to, fresh cow's milk.

1. DIFFERENCES BETWEEN HUMAN MILK AND

Cow's MILK.—(a) *There are important differences in the percentage composition of the two milks.* These differences are shown in the following table:—

	Human milk.	Cow's milk.
Proteid ...	1·5-2 per cent.	3·5 per cent.
Fat ...	3·5-4 „	3·5-4 „
Carbohydrate ...	6-7 „	4·5 „
Salts ...	·2 „	·7 „

Very varying figures have at different times been published to represent the average composition of human milk, but the above may probably be regarded as substantially correct. Whilst these differences depend partly no doubt on improved methods of analysis in recent years, there are unquestionably considerable variations in the percentage composition of human milk, depending partly on the period of lactation, and still more upon whether the breast were full or comparatively empty when the milk was taken, but occurring also in the milk from different mothers even when taken under exactly comparable conditions. The chief differences between cow's milk and human milk are clearly that the latter contains only half the quantity of proteid and 50 per cent. more sugar than the former. The difference in the quantity of salts should also be noted, although but little, possibly too little, importance has hitherto been attached to this.

(b) *There are differences in the character of the curd yielded by the two milks.* It is well known that human milk, either in the stomach or when acted upon by acids, yields a fine flocculent curd, which is easily digested by the gastric juice; whereas cow's milk under similar circumstances yields a curd composed of large hard masses, which not being properly digested in an infant's stomach, give rise to flatulence and dyspepsia, and not uncommonly to vomiting and diarrhoea. It is important to recollect that this difference in the character of the curd in the two cases does not depend to any great extent on the larger percentage of proteid in cow's milk, but mainly on a difference in the nature of the proteid. That of cow's milk consists chiefly of caseinogen, which coagulates into tough masses of casein, but there are also present in small quantity certain forms of albumin (chiefly lactalbumin), resembling the serum-albumin of the blood. It is these which form the greater part of the proteid in human milk, casein being present in small quantity only. They

differ from the latter in being partly precipitated by boiling, but not coagulated by acids or rennets; and as they are therefore all present in whey after the casein has been removed, they are often called the "whey proteids." Considerable uncertainty exists as to the exact proportion between the two in human milk and cow's milk respectively, but the following table gives an approximate idea :—

	Human milk.	Cow's milk.
Casein	... '6 per cent.	... 2·8 per cent.
Lactalbumin	... 1·2 "	... '6 "

It seems probable, moreover, that the difference in the salts in human milk as compared with those in cow's milk, may account for the greater fineness and subdivision of the curd formed in the stomach by the small quantity of casein which is present in human milk.

This indigestibility of the curd constitutes a far more serious difficulty in the use of cow's milk for young children than does its difference in percentage composition from human milk; for whereas the latter can be altered with comparative ease, the character of the curd is only capable of modification to a limited extent.

(c) *Human milk is practically sterile, whilst cow's milk is swarming with micro-organisms.* It is true that in fresh and carefully drawn cow's milk the number of microbes is comparatively few, but they increase with enormous rapidity unless it is kept cold. As a result, by the time it reaches the consumers in large towns, especially in poor districts and in the summer, milk contains an immense number of many kinds of microbes and also their products, which are often very toxic bodies. It is now well recognised that many diseases are conveyed in this way; typhoid fever, cholera, scarlet fever, diphtheria, foot-and-mouth disease and probably tubercle may be mentioned, and, most important of all for infants, acute epidemic diarrhoea, so fatal to young children during the hot months of the year, and yet comparatively rarely met with in those fed entirely at the breast. Moreover, milk which is not perfectly fresh is almost certain to act more or less as a gastro-intestinal irritant, even though it may not give rise to any definite disease.

(d) *There is a difference in reaction.* Human milk is alkaline or amphoteric, whereas cow's milk, at any rate as met with in towns, is almost invariably more or less acid.

2. HOW TO RENDER COW'S MILK A SUITABLE FOOD FOR THE HUMAN INFANT.—It will be most convenient to deal *seriatim* with the differences between human milk and cow's milk which have been enumerated, and consider how they can be best overcome.

(a) *The difference in percentage composition.* The essential point to bear in mind is the large excess of proteid in cow's milk; this necessitates dilution of the milk; and as the greater part of the proteid is in a comparatively indigestible form, it is necessary, in feeding young infants and those with very weak digestions, to dilute sufficiently to bring the percentage of proteid below, and often considerably below, that contained in human milk.

It is evident that this dilution reduces the sugar present to a totally inadequate quantity, seeing that it is already deficient even in pure cow's milk. This can easily be remedied by the addition of sugar, and obviously milk-sugar, the variety normally present in milk, should be used if possible. The only objection is its price, a shilling a pound or thereabouts; but the ordinary cheaper cane-sugar is very apt in young infants to give rise to fermentation, flatulence, and symptoms of dyspepsia.

Lastly, the dilution of the cow's milk seriously diminishes also the percentage of fat: the deficiency can be remedied by the addition of cream, but this is obviously not such a simple matter as adding sugar, and the question of its necessity will be discussed later.

The next problem is, By whom shall the necessary modification of the cow's milk be carried out? The ideal plan is doubtless the American method, first introduced by Professor Rotch, of Harvard, and carried out practically in this country by the Walker-Gordon and other milk laboratories established in London and other large cities. The essential feature of this system is that the physician writes a prescription giving the precise percentages of proteid, fat, and sugar which he considers necessary for any particular child, this being made up at the milk laboratory daily, by mixing together in proper proportions cream, separated milk (*i.e.* milk from which the fat has been removed), and a standard solution of milk-sugar. The exact quantity of milk ordered for each feed in the twenty-four hours is supplied in a separate bottle. This system enables the physician to regulate absolutely the

composition of the milk which the child receives, and to make such alterations from day to day as may seem desirable. When efficiently carried out with perfectly fresh milk, it certainly presents many advantages, especially for very young and delicate children who have great difficulty in digesting the casein of cow's milk. For such infants it may be necessary to reduce the proteid below one per cent., whilst giving the normal, or nearly the normal, quantity of fat and sugar. When such a low percentage of proteid has to be given in milk prepared at home, the excessive dilution necessarily involved becomes a cause of great inconvenience, for though sugar may be added to any extent, the addition of cream is a much more troublesome matter.

Whilst, however, this is doubtless the ideal method of artificial feeding, there are important practical difficulties in carrying it out, which must always greatly limit its use. It costs probably about a guinea a week, it necessitates accessibility to a milk-laboratory, and it involves constant supervision by a medical man, who alone is competent to make the requisite alterations in the composition of the milk. Clearly the mere question of expense limits its use to a very small section of the population; for even if a socialistic commonwealth of the future undertook to supply modified milk to all infants at the expense of the rates, it would probably hesitate to provide the necessary medical supervision for every child. Certainly for the present the use of the Walker-Gordon milk is practically restricted to the delicate children of well-to-do parents.

There are on the market a number of so-called "humanised" milks, having approximately the composition of human milk. The name, however, is a misnomer, for the indigestible casein remains, in smaller proportion than in the original cow's milk it is true, but still forming the same tough coagulum in the stomach. The Aylesbury Dairy Company prepares two strengths of this humanised milk, No. 1 containing about 1.4 per cent. of proteid, and No. 2 about 2.2 per cent. Another variety is that known as Dr. Gaertner's, which is made in three different strengths, according to the quantity of proteid required. Paget's modified milk may also be mentioned: it is a concentrated and modified cow's milk, which has to be diluted with a variable quantity of water according to the age of the child to whom it is given.

Perhaps the chief drawback to preparations of this character is the danger of their being either not fully anti-scorbutic or else not perfectly sweet, for there is good reason for believing that if milk is sterilised sufficiently to keep sweet for an indefinite period its anti-scorbutic power is impaired, whilst if not fully sterilised, and not used within a day or two, there is the danger of it containing some toxic products of decomposition. Moreover the use of these preparations favours the making of abrupt changes in the milk, instead of the very gradual alterations which are so desirable, and encourages both in doctor and mother an automatic, "rule of thumb," method of feeding, rather than an intelligent mode of dealing with the difficulties to be overcome in any given case.

On the whole there is much to be said in favour of having the cow's milk modified at home; true, this involves more trouble, care, and intelligence on the part of the mother or nurse; and human nature being what it is, always craves for something which is supposed to be a specific, something which can be given without further trouble and with implicit confidence, whether it be a drug guaranteed to cure a diseased condition, or some particular food or milk preparation warranted to agree with a dyspeptic baby. It is, however, the duty of medical men to make it clear to those in charge of infants that there is no perfect artificial food, and that no two children are alike in their powers of digestion, so that it does not follow in the least that what agrees admirably with one child will be equally good for another, but that for each one it is largely a matter of experiment as to what method of feeding will prove most suitable.

As a rule we have no idea through how many hands "humanised" milk has passed and how long it has been kept before being delivered; it is better, if possible, to know what actually is done to the milk, and to have it used before many hours have elapsed. Moreover when it is dealt with at home slight alterations can be made from day to day almost as easily, although not so accurately, as in the milk-laboratory. Fortunately, a milk of perfectly uniform composition is by no means so absolutely essential as might at first appear, for as Dr. Rotch has himself shown by examining the breast milk of healthy mothers of thriving children, the proteid may vary from a little over one to more than four per cent.,

the fat from two to five per cent., and the sugar from rather less than six to over seven per cent. Clearly, therefore, human milk is very far from being a food of fixed composition.

Obviously the simpler the method of modification the better, and for this reason it would seem that some of the plans recommended, however excellent in theory, are too complex for use amongst the poorer classes.

The plan I would suggest is indicated in the annexed table.

milk. For instance, if, as shown in the table, a child two months old is having at each feed 3 ounces of diluted milk containing only 1.6 per cent. of fat the addition of a drachm of centrifugalised cream will increase the fat to 3.6 per cent., nearly the correct proportion. The use of cream obtained by skimming milk which has been standing is less advisable, as the quantity of fat it contains varies so greatly. On an average the fat may be taken at 15 per cent., and the quantity of cream added to the child's milk must be increased accordingly.

Home Modification of Cow's Milk.

Age.	Dilution.	Feeds in 24 hours.	Quantity per feed.	Total cow's milk in 24 hours.	Total diluted milk in 24 hours.	Percentage of proteid.	Percentage of fat.	Milk-sugar added to each feed.	Total percentage of sugar.
2-6 days	1 to 3	10	1 oz.	2½ ozs.	10 ozs.	0.87	1.0	20 grs.	5.0
7-28 "	1 to 2	10	2 ozs.	7 "	20 "	1.17	1.3	45 "	6.0
2 months	1 to 1½	9	3 "	11 "	27 "	1.4	1.6	60 "	6.0
3 "	1 to 1	8	4 "	16 "	32 "	1.75	2.0	90 "	6.5
4-5 "	1 to ½	7	5 "	24 "	35 "	2.3	2.7	90 "	6.5
6-7 "	1 to ¼	6	6 "	29 "	36 "	2.8	3.2	90 "	6.5
8-9 "	Pure	6	7 "	42 "	42 "	3.5	4.0	60 "	6.5
10-12 "	"	5	8 "	40 "	40 "	3.5	4.0	Give some	infant food.

It is desirable, but by no means absolutely essential, to add centrifugalised cream (containing nearly 50 per cent. of fat) to the above mixtures, beginning with half a teaspoonful in the second week, increased to one teaspoonful by the end of the third month, and continued until pure milk is given.

Temperature of milk, 98°-100°

Boiled water or some other diluent is added to the milk so as to reduce the proteid during the first few days of life to less than one per cent., the proportion of water being gradually diminished as the child gets older. Milk-sugar is added to each feed in about the quantity indicated, in order to increase the total amount of sugar at first to about five and eventually to between six and seven per cent. During the earlier months of life milk thus modified is necessarily markedly deficient in fat; this can be met by the addition of cream, most conveniently of centrifugalised cream; for as this contains nearly 50 per cent. of fat, one teaspoonful of it added to three ounces of milk increases the fat in the latter by two per cent. By adding from a half to one drachm of such cream to each feed of modified cow's milk the fat is raised to about the normal proportion present in human

Whilst, however, this addition of cream is no doubt desirable, it is by no means essential in a large proportion of cases. Healthy children who are able to digest the milk given them, and to take by the third month milk diluted with only an equal volume of water, commonly do quite well without any added cream. If they thrive without it, so much the better; for cream is comparatively expensive, its fat is probably somewhat less digestible than that of human milk, and also the process of centrifugalising breaks up some of the fat globules, so that they may form a thin oily layer at the top of the bottle. Of course if no cream is added, it is essential that the milk used should be thoroughly good, containing about 4 per cent. of fat.

It must always be borne in mind that the figures in the appended table are merely average ones, and that in individual cases very considerable

variations may be necessary, both in the degree of dilution and the quantity of milk given. Children with delicate digestions may be unable to take pure cow's milk until they are twelve months old, whilst others, robust and strong, can digest it perfectly well by the time they are six months old. It is, moreover, most important to recollect that all changes, both in dilution and in the frequency of the feeds, must be made exceedingly gradually. Avoidance of sudden change is one of the most important factors in the successful feeding of infants.

(b) *The difference in the character of the curd.*

As has been already pointed out, a far more serious obstacle to the use of cow's milk as a food for infants than its difference in percentage composition from human milk is the indigestibility of its curd. Simple dilution, especially when carried to the extent of two or three parts of water to one of milk, markedly diminishes the toughness and density of the curd in the stomach, and fortunately proves quite sufficient for a large number of infants, the difficulty being greatest during the first month or two of life. To some slight degree perhaps barley-water or lime-water cause the curd to coagulate in rather smaller masses than when pure water is added, but if there be any difference at all, it is certainly very trivial.

It has been shown recently that if a part of the lime salts in cow's milk is precipitated by citrate of soda in the proportion of one or two grains to each ounce of unmodified milk, the subsequent addition of rennet only precipitates a fine, loose, and therefore far more digestible curd, and clinical experience seems to indicate that in the stomach a similarly light curd is formed; at any rate so simple a measure well deserves a careful trial.

Some children who inherit possibly a naturally feeble digestion, or to whom some unsuitable food has been given and a chronic gastric catarrh set up, may for a long time be unable to tolerate ordinary cow's milk, no matter how carefully diluted or modified. The best plan under these circumstances is probably to try peptonised milk for a time. Cow's milk, suitably diluted according to the age of the child, should be subjected to the peptonising process for not less than twenty minutes, and then boiled. The slightly bitter taste produced is not likely to be objected to by young infants. Milk-sugar may be added as re-

quired by the amount of dilution. The time occupied in the peptonising process should be gradually reduced as the child's digestive power improves, and the use of the milk should rarely be continued for more than a few weeks, or else the stomach will become less and less able to discharge its proper functions. There is also some risk of the development of scurvy.

Peptonisation continued even for twenty minutes does not, however, by any means prevent the formation of a certain amount of curd in the stomach, and some infants are unable for a time to digest any casein whatever. In such cases it is best to feed the child temporarily on whey, introducing an occasional feed of peptonised milk as improvement occurs. Whey is prepared by adding a teaspoonful of rennet to a pint of milk, and allowing the mixture to stand for a quarter of an hour or so in a warm place (preferably at a temperature of about 100°); then break up the curd which has formed and strain off the fluid part, which had better be boiled before it is given to the child. The clot produced by the rennet includes all the casein of the milk and most of the fat; the liquid part, or whey, contains all the sugar and salts, the lactalbumin and a small quantity of fat. Its approximate composition is: sugar, 4.5 to 5 per cent; proteid, rather less than 1 per cent.; fat, .3 per cent. Being deficient in proteid and still more in fat, it is obviously a very insufficient food by itself, and if used for more than two or three days needs to be supplemented by the addition of cream and raw meat-juice. Amongst the poorer classes, however, the difficulties in the way of preparing so elaborate a dietary may be almost insuperable, so that one has often to be content with giving whey only for a few days (with perhaps some added milk-sugar), in the hope that the child will then be able to digest a little peptonised milk given with or in between the feeds of whey. Some broth, prepared from mutton, veal, or chicken, may sometimes be given in addition to whey; it contains about 1 per cent of proteid, and a somewhat larger quantity of extractives, which may be distinctly useful for their stimulating properties.

(c) *The presence of micro-organisms in cow's milk.*

These may be destroyed by boiling or sterilising the milk. Few questions have been more hotly debated than that of the necessity of this precaution. The chief arguments urged against boil-

ing are: (1) That the taste of the milk is altered, so that children do not take to it so well; (2) that the use of boiled milk causes constipation; (3) that boiling deprives the milk of a certain amount of proteid, so diminishing its value as a food; (4) that the prolonged use of boiled milk may give rise to scurvy. Let us examine these arguments *seriatim*. (1) If the child is fed from the first on boiled milk only, the alteration in taste is obviously of no consequence, as he can never be aware of it. (2) It is possible that boiled milk has a very slight constipating effect; on the other hand, when unboiled it only too often causes diarrhoea, a far more serious matter. Any tendency to constipation is easily overcome by adding a little manna or carbonate of magnesia to the milk.

3) It is true that boiling leads to coagulation of some of the lactalbumin, the most digestible proteid in cow's milk, but as this only forms about one sixth of the total proteid present, its loss cannot be so very important, seeing that what remains is still largely in excess of that contained in human milk. (4) I am not convinced that there is any evidence to show that milk which has just been raised to the boiling point ever gives rise to scurvy. Without doubt children have developed scurvy whilst being fed exclusively on boiled milk, but in these cases, I believe, the milk has been subjected to prolonged boiling or prolonged sterilisation, to enable it to be kept, if necessary, for an indefinite period.

It has been suggested that the miserable condition of many of the infants in the poorer districts of London is due to their being fed on boiled milk. My own impression is very strong that in the great majority of such cases it is not a question of boiled *versus* unboiled milk, but of an absolute insufficiency of milk of any kind. Dr. Dukes of Rugby is an enthusiastic advocate of unboiled milk; but it is one thing to give milk, the freshness and purity of which can be to a large extent guaranteed, to robust schoolboys, and quite another thing to give milk, of which we are far from being able to guarantee either the purity or the freshness, to feeble infants in a town slum. Certainly if we know all about the milk, that it comes from healthy cows, milked in a cleanly fashion, and that it is kept for a short time only and then under thoroughly sanitary conditions, there is no necessity for boiling: but as in ordinary town life all knowledge on

these points is conspicuously absent, except that the milk as sold to the poor is almost certainly by no means fresh, it is surely better to adopt the simple precaution of boiling. In the summer, at any rate, this would seem almost indispensable, as it is probable that milk is mainly responsible for the conveyance of the poison of that exceedingly fatal disease, acute epidemic diarrhoea. One caution is necessary: whilst boiling destroys any pathogenic germs which may be present in milk, so enabling it to be kept longer than would be otherwise possible, it does not destroy toxic products which may have been formed by these germs, and it is therefore quite useless to boil milk which is already just "on the turn."

A question arises as to whether it is sufficient merely to boil the milk or if it is desirable to use a more elaborate sterilising apparatus, in which the milk is heated by steam to a temperature of 212° . Aymard's is one of the simplest forms of steriliser, and perfectly efficacious. In other varieties, such as Soxhlet's, the milk is sterilised in a number of separate bottles, each containing enough for one feed. For all practical purposes simple boiling is probably sufficient, although it is possible that in a proper sterilising apparatus the milk does not undergo quite as much change in character; so that if the child is under the care of a careful and intelligent nurse or mother the use of a sterilising apparatus is perhaps preferable.

Practically all the advantages of boiling or sterilisation, without any of the above-mentioned drawbacks, are obtained by what is known as Pasteurisation—*i.e.* by keeping milk for from twenty to thirty minutes at about 155° F., at which temperature the lactalbumin is not coagulated. As, however, the process needs much care and a somewhat elaborate and expensive apparatus, it is not suitable for ordinary domestic use. Milk which has merely been Pasteurised does not keep so long as that which has been sterilised.

(d) *The acid reaction of cow's milk.* This may be corrected by the addition of from five per cent. to ten per cent. of lime-water, or of one or two grains of bicarbonate of soda to each ounce of modified milk. Possibly both these bodies increase to some slight degree the digestibility of the curd, but the mere rendering of the milk distinctly alkaline does not appear to be a matter of much importance. To secure the full benefit

of the effect of the lime-water or of the bicarbonate of soda upon the curd, it is desirable to add to the milk not less than 25 per cent. of the former or three grains to the ounce of the latter.

Practical summary of how to feed infants on cow's milk.—The first essential is obviously to secure a supply of milk as pure and fresh as possible, remembering that, in hot weather particularly, unless the milk is kept artificially cooled, micro-organisms multiply in it with enormous rapidity. In towns, unfortunately, this is a matter over which the individual family practitioner has little or no control. It is only by legislation and municipal supervision that the purity and freshness of milk can be guaranteed. In towns, at any rate, the milk should be boiled for five minutes, or sterilised in a proper apparatus, as soon as it is delivered at the house; in hot weather particularly this precaution should be regarded as absolutely essential. Each feed should be prepared separately, a certain proportion of diluent being added to a given quantity of milk, according to the age and digestive capability of the child (see table). The diluent used may be merely plain boiled water, or lime-water (prepared with boiled water), or barley-water, and in some cases of difficult feeding citrate of soda or bicarbonate of soda may be added as already directed. A mixture which I have often found useful is—

Sodium bicarbonate	...	five grains.
Saccharated solution of lime		fifteen minims.
Dill-water	to one drachm.

Half a teaspoonful of this may be added to each feed in the case of an infant under three months, and one teaspoonful for one above that age. Milk-sugar, and if necessary cream, should then be added in proper proportion according to the age of the child. The milk thus modified must be warmed to a temperature of about 100°, and given from a boat-shaped feeding-bottle with an india-rubber teat. On no account should a tube be allowed. The teats usually sold are provided with from one to five leech-bites each; those with three are perhaps on the whole the most generally suitable. A tightly fitting flannel bag may be put on the bottle to keep the milk warm whilst the child is taking it. Any milk left after a feed should be thrown away, the bottle and teat thoroughly washed with hot water, and kept in clean cold water

until wanted again. The teat should be boiled daily.

There is as a rule no advantage in feeding a child on the milk from one cow only, as the variations in the composition of such milk are likely to be greater than in the mixed milk from a number of cows.

3. OTHER FOODS BESIDES FRESH COW'S MILK.

Goat's milk.—The composition of this is practically identical with that of cow's milk, and it contains the same proportion of casein to lactalbumin, so that the curd is hard and massive. There is therefore as a rule no advantage in feeding a child on goat's milk rather than on cow's milk, and both require the same degree of dilution. Goats, however, are much less subject to tuberculosis than cows, consequently in that respect their milk is safer.

Asses' milk.—The composition of this is: proteid, 1.7 per cent.; fat, 1 per cent.; sugar, 5.5 per cent. There is only about one per cent. of casein, and this when coagulated forms an exceedingly fine flocculent curd, almost as digestible as that of human milk, so that asses' milk often forms an excellent substitute for cow's milk in the case of children who have great difficulty in digesting the casein of the latter. On account, however, of its deficiency in fat it is unsuited for prolonged use without the addition of cream. It is also somewhat laxative. Its price is prohibitive, except for the wealthy.

Condensed milk.—Only those brands should be used which contain all the cream of the original milk.

The advantages of condensed milk are: (a) It is somewhat more digestible than fresh milk, owing to the curd being more broken up. A peptonised condensed milk can also be obtained which is still more easy of digestion. (b) It is sterile, and is therefore often very useful when the freshness of ordinary milk may be doubtful—e.g. whilst travelling or during hot weather in large towns.

The disadvantages are: (a) It contains as a rule a large quantity of cane-sugar, added as a preservative. Not only is this apt to cause fermentation and flatulence, but, in order to reduce the sugar to a proper proportion for the child, condensed milk has to be so much diluted as to render the fat seriously deficient (it may be only 1 per cent. or less), and to a less degree the proteid also. As a result of this deficiency of fat and excess

of sugar children fed on condensed milk frequently develop rickets. It is true that several brands of unsweetened condensed milk are now prepared, to which when properly diluted milk-sugar should be added as to fresh cow's milk, but this cannot be relied upon to keep sweet for more than thirty-six hours after the opening of the tin. (b) The prolonged and exclusive use of condensed milk is a common cause of scurvy, owing to the absence of any fresh element from the diet. It follows, therefore, that whilst condensed milk may in certain cases be decidedly useful for a short time, it should never be given for longer than about six weeks without the addition of cream to compensate for the deficiency in fat, and of some fresh element—grape or orange juice or raw meat juice—as an antiscorbutic.

Infant foods.—It is probable that on the whole children would be the gainers rather than the losers if all so-called infant foods were abolished. During the first eight or nine months of life—that is to say, during the normal period of lactation—they are, when not positively injurious, as a rule unnecessary. Afterwards they might quite well be replaced by far less expensive articles of diet. Their enormous sale is a striking testimony in part to the real difficulty experienced in bringing up infants by hand, but still more to the ignorance, credulity, and lack of intelligence of those in charge of children. Just as adult patients expect to receive some drug or new method of treatment which will at once cure the special complaint from which they are suffering, so mothers and nurses ever hope to find some particular food which without further effort or trouble on their part will exactly suit a dyspeptic or marasmic infant. If several different foods are tried in succession, and the child survives, the one last given of course gets the credit. Persistent, not to say unscrupulous, advertisement does the rest.

No infant food, no matter how perfect it may appear to be in composition, can by itself constitute a satisfactory food for more than a few weeks, because, unless some fresh element is added, scurvy is liable to supervene. Furthermore, with very few exceptions, all these foods are exceedingly deficient in fat; in fact, the great majority hardly contain any.

It is convenient to divide the large number of infant foods into the following groups:

(a) Foods composed of desiccated milk to which other constituents may have been added. These (and Mellin's food, to be afterwards mentioned) are the only ones at all suitable for infants under six months old. They present much the same advantages as condensed milk, viz. that they are sterile and often more easily digested than fresh milk; on the other hand, they are somewhat deficient in fat, and entirely wanting in the antiscorbutic element. The former may be remedied by the addition of cream, the latter by giving to the child after the first few weeks some raw meat juice or fruit juice. The best known of these milk foods are the Allenbury foods, No. 1 consisting essentially of desiccated cow's milk, somewhat modified in composition, and No. 2 of the same with a little fully malted flour added; and Horlick's malted milk, a preparation similar in many respects to the No. 2 Allenbury, but far more deficient in fat.

The objections to feeding a child exclusively on any one of these foods, except for a comparatively short period, have already been mentioned. They may sometimes, however, advantageously be added in small quantities to cow's milk instead of milk-sugar, especially when the milk has to be considerably diluted; they increase its value as a food and also in many cases its digestibility. They are too expensive to be of much use to the poorer classes.

(b) Malted foods, in which the starchy ingredients have been more or less completely converted into soluble carbohydrates—dextrin, dextrose, maltose, etc. In Mellin's food the conversion is complete, and this preparation may accordingly be added to the milk of quite young babies, and certainly in some cases facilitates its digestion. It has at times a slightly laxative action. In the Allenbury No. 3 and in Savory and Moore's food some unconverted starch remains, and therefore they are not suitable for children less than six months old; after that age they form a useful addition to one or more of the daily feeds of milk.

Benger's food may be mentioned under this group; it consists mainly of proteids and carbohydrates, both of which are largely predigested by pancreatic ferments; consequently its advantages and disadvantages are much the same as those of peptonised milk, but it is necessary to bear in mind that it contains hardly any fat.

Nestlé's food occupies an intermediate position between the dried milk preparations and the malted foods, as it consists of desiccated milk, cane-sugar, and a good deal of unconverted starch.

(c) *Farinaceous foods.* These are prepared from flour, and consist mainly of unconverted starch, with a certain amount of proteid. The best known are: Ridge's food, Neave's food, Frame food, and Chapman's Wheat Flour. On no account should they be given under the age of six months, and preferably not until the child is nearly a year old, although when this age has been reached it is difficult to see that they possess any great advantage over ordinary and much cheaper articles of diet, such as bread, potatoes, plain biscuits, arrowroot, and other preparations of starch or flour.

Finally, we may enumerate what may be termed the Golden Rules for the successful rearing of an infant on cow's milk:

1. *Fresh and clean milk.*—The milk must be as fresh as possible, and whenever there is the slightest doubt as to its purity it should be boiled. It must be given from a perfectly clean bottle, without a tube.

2. *Dilution.*—Free dilution with some sterilised fluid is essential to overcome the indigestibility of the casein, especially for very young infants, and at the commencement of artificial feeding. Milk-sugar and perhaps cream must be added to compensate for this dilution.

3. *Regularity.*—The feeds should be given at absolutely regular intervals; important as this is for children who are breast-fed, it is yet more so for those brought up by hand.

4. *Avoidance of sudden changes.*—All changes must be made gradually, whether in the frequency of the feeds, the quantity given each time, or the extent to which the milk is modified.

5. *Watch the weight.*—Remember that steady gain in weight is *the* test of satisfactory progress: if a child does not gain about four ounces a week, there is something wrong. Slight symptoms of dyspepsia may be ignored so long as the weight is satisfactory. In fact, at the beginning of artificial feeding in a young child it is hardly reasonable to expect the same immunity from digestive disturbance as in a healthy breast-fed baby. On the other hand, a child who is not gaining weight satisfactorily, no matter how free he may be from

gastro-intestinal disturbance, clearly needs some alteration in his diet.

6. *Intelligence.*—This is *the* essential, without which all else may be but of little worth. It is useless to regard children as mere machines; and no system of artificial feeding can be satisfactory which depends on absolutely fixed rules. Broad regulations must be laid down, but within these should be much elasticity. Infants vary so enormously in their digestive capacity that an intelligent consideration from day to day of the needs of each individual is essential for the attainment of the utmost measure of success in hand-feeding; and it is for this reason especially that I advocate the home modification of milk rather than the purchase of one of the artificially prepared "humanised" milks. It is as useless and unpractical to expect to be able to feed a number of babies successfully on a particular kind of "humanised" milk as it is to try to train older children satisfactorily in a "barrack school." Alike from the physical and mental standpoints children need to be dealt with individually, and not collectively.

A CASE OF ACUTE PLUMBIC ENCEPHALOPATHY FOLLOWED BY MUSCULAR PARALYSIS AND OPTIC NEURITIS.

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In the following case the number of symptoms presented, together with their order of occurrence, show in a marked manner the gradual impregnation of the system in one exposed to the influence of lead for a lengthened period, and the recurrence of symptoms and their gradual increase in severity following continued exposure.

The patient, a woman *æt.* 23 years, a white-lead worker, had worked over nine years in a lead factory. During almost the whole of this period she was engaged removing the carbonate of lead to the rolling mills from the "stacks," where thin sheets of lead are converted first into the sub-

acetate by the action of acetic acid contained in pots arranged in layers, and finally decomposed by CO_2 emitted from tan. She had worked for this period, on the whole, regularly, and had been suspended from work on four occasions for periods of three months' duration each, as suffering from colic, etc. She was last seen at the weekly examinations on the week previous to her present illness, when nothing was observed beyond the usual degree of anæmia present in workers who have worked for a considerable period in a lead factory.

She began to notice that slight constipation, which had previously yielded to small doses of Epsom salts (obtained at the works), became more and more intense, until large doses (1 oz.) taken night and morning were insufficient to cause a movement of the bowels.

Along with this a feeling of increasing weakness was experienced which ultimately compelled her to take to bed, at the same time complaining of pains in the knees, elbows, and back. Thirst, combined with nausea and slight headache, was also felt. The following day she was suddenly seized with griping pains in the region of the umbilicus, accompanied by vomiting of a greenish liquid. The pains were of a paroxysmal nature, increased in severity, and the vomiting occurred both during and in the intervals of the pains.

At this stage hot applications were applied by her to the abdomen without relief, and she lay with her legs bent up, pressing the hands firmly on the abdomen or rolling from side to side.

These symptoms continued, headache increased and was accompanied by vertigo. She attempted to get out of bed, but now found her legs would not support her. The headache steadily increased and led to insomnia, which was followed by delirium and ultimately loss of consciousness.

When consciousness returned, after six days, she was found to be suffering from optic neuritis. Paralysis of the extensors of both forearms and muscles of left leg as far as knee came on suddenly.

The optic neuritis led to optic atrophy. The muscular paralysis improved under treatment.

In this case the worker had been employed in the white-lead department, carrying the white-lead on trays on the head from the "stacks" to the rolling mills, the old Dutch process being used. This work is one of the most dangerous in a lead

factory from the readiness with which the dust is made to rise and the quantity of it in the atmosphere around the workers. The recurrent attacks of colic here point to the gradual absorption of lead and its increasing action on the system, and, as one of the commonest symptoms of plumbism, and in almost all cases a precursor to the later and more severe cases, is important both from the point of view of the susceptibility of the worker and the danger in continued exposure. One attack of colic should be sufficient ground, then, on which to order permanent suspension from work when such symptoms as delirium, delusions, temporary loss of sight, and even epilepsy, may follow a first attack.

Epilepsy, however, is seen more frequently as a later symptom and after recurrent attacks of colic, constipation, and so forth.

The teeth and gums of this worker were in very good condition, owing, no doubt, to her care in brushing them, and only opposite the lower incisors, where the gums were slightly ulcerated, could the "blue line" be seen. No patches were apparent on the buccal mucous membrane.

Her menses, previous to her occupation as a lead worker, were regular; now she suffered from amenorrhœa.

Paralysis in lead-poisoning is always a late symptom, and usually seen in those who have had previous attacks of plumbism (colic, vomiting, etc.) and have been for a lengthened period exposed to the influence of lead. As in this case, they usually appear suddenly and may be preceded by shooting pains besides the frequent arthralgic pains and muscular cramps in the limbs.

The optic neuritis here was followed by atrophy and complete loss of sight.

Transient loss of sight I have seen associated with such symptoms as colic and slight headache, but the severe progressive lesions are usually seen in those with other severe nervous symptoms, and where the worker has previously suffered from the effects of saturnine intoxication.

WE have received a sample bottle from Burroughs Wellcome and Co. of "Tabloid" Donovan Solution, M 5. The conditions in which arsenious iodide is usually prescribed are generally of such a nature as to demand more or less protracted treatment, and "Tabloid" Donovan Solution has been introduced to provide a convenient means of administering this preparation.

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MENTAL HYGIENE IN CHILDHOOD.*

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MR. CHAIRMAN, LADIES AND GENTLEMEN,—In addressing you this evening I am keenly aware that I am addressing many who have interested themselves and made serious study of the various problems of education. The order of the unfolding of the mental faculties in childhood, and the influence that order should have in the arrangement of studies, are psychological questions, and demand most careful handling, and the various methods of teaching also require more matured consideration than I am prepared to give them. My remarks will be confined mainly to the discussion of the question of mental hygiene in childhood, and it is solely as a medical specialist that I venture to bring before you some of the thoughts which have occurred to me when dealing with the ill results of a faulty guidance over the educational period of childhood.

Max Nordau states in most emphatic terms that medical specialists of insanity have failed to understand their duty, and that it is time for them to make themselves heard. Professor Bianchi also urges that it is prejudice to believe that psychiatry must be enclosed within a sanctuary like that at Mecca. It is not sufficient that the professor of psychiatry should give a few lectures to jurists, and publish observations in technical journals. He should speak to the mass of cultivated persons who are neither physicians nor learned in law, and in general publications and accessible conferences endeavour to throw light upon the leading facts in mental therapeutics. I agree with Max Nordau that in all other branches of medical science it is discerned that hygiene is of more importance than

* Delivered before the Childhood Society at the Sanitary Institute.

therapeutics, and that the public health has much more to expect from prophylaxis or prevention than from treatment. These considerations have enabled me to overcome the customary diffidence displayed by alienists who could and ought to atone for their negligence in such matters, and I for one would gladly welcome popularised expositions from the pens of experts whose prominent official status would recommend them to the consideration of all concerned. At first I was strongly tempted to deal with the general ideals of education, and I was prompted to discuss the numerous theories as to what ought to be the chief end of education. Doubtless, however, you will be glad that I refrain from so doing, and confine myself to that which is more within my experience and that which may perhaps be more productive of some useful results.

We alienists have a problem before us which is asserting itself with such ever-increasing and almost overwhelming force that it alone might well stand as sufficient justification for, not only individual inquiry, but for the most serious consideration of the nation. I allude to the mental health of the community.

In the Report of the Commissioners in Lunacy for England and Wales, 1904, we learn that there were in England and Wales on January 1st 117,199 notified lunatics. The ratio of the insane to the population in England and Wales is instructive. The aggregate on January 1st last gives a ratio of one insane person to 288 sane persons. This ratio has steadily increased from the year 1859 (when reliable statistics of insanity commenced), at which date the ratio stood at 1 to 536. This rise has not been quite regular for all classes. In fact, the increase has been practically confined to the "pauper" class. It would be interesting to determine how long it will be before the ratio is as 1 to 1. Certainly not long if there be a rise in the ratio of 248 in forty-five years. In Scotland the ratio is 1 to 279, in New South Wales 1 to 299. The American lunacy figures are infinitely more startling than our own. In his Statistical Report for the year the Superintendent of the Chicago Insane Asylum states that Chicago contains one insane person to every 150. The percentage has quadrupled in fifty years, and is increasing at the fastest rate in the world. These figures refer to certified lunatics under official cognizance. They do not include the immense hordes of those who

as imbeciles are yet permitted to remain as citizens, the thousands who are on the borderland between sanity and insanity, the weak-minded who are unable to compete with their fellow-beings, the epileptic, the partially demented, the hysteric, the deluded, the morally insane, the drunkard, and, more numerous than all, the neurasthenics, who, having run their course all too soon, are incapacitated from taking part in, or adding to, the physical or mental welfare of the race. Were we provided with statistics relating to those who by reason of mental infirmity are incapacitated from competing, or even aiding in, their own survival, we would realise more completely the true state of affairs, and one and all would rise in revolt at the insidious onset of a national dementia which ere long it may be too late to combat or even ameliorate. For reasons to be given later I now state that with the rise in civilisation there is a corresponding increase in the official cognizance of those who suffer from mental incapacity. This official cognizance must go on increasing. The requirements of a brain age necessitate the recognition of those who are unable to compete; the timorous decorum of conventionality and legislature enforces an ever-narrowing standard of conduct; whilst an ever-increasing inheritance of unstability, or fixity of idea, must of necessity narrow, warp, or even blind the individual to interests which are far-seeing and vital.

In order to tackle this problem, it is essential that we should seek for the cause. The various committees who are dealing with the question of physical deterioration devote much learning and acumen to their investigations; but the problem before them is of slight importance compared with that of the mental degeneration of the civilised race.

I do not propose to deal here with many of the innumerable factors which influence the life history of the race. Time allows me merely to offer some reflections upon the problems of physical exercise and education (moral and intellectual) in their relationships to the mental hygiene of the child and individual. Although I have an immense number of data derived from research and experiment, I prefer to speak in general terms upon the rationality of our present system of dealing with the infant mind; and as my experience has been based mainly upon the results of defective hygiene, I give you these observations for what they are worth.

That there should be bodily health or vigour in physical or mental training is a leading postulate and requires no exemplification at my hands. There are questions, however, which engage the attention of everyone who has the responsibility of training children, and to which I think it advisable to refer. What more common question than that of the regulation of physical and mental exercise, and their mutual adaptation so as to produce the best results?

Quite recently, under the heading of "Games and Brains: or Is the Hothouse Athlete a Stupid Person?" some notable scholars denied Dr. Kenealy's contention that there is no more stupid person than the man or woman who excels in games, none more lacking in imagination, in subtlety, in general brain power, and that the forced athletics of our modern schools have much to do with the deplorable mediocrity and poor physique of modern youths.

This rather sweeping statement was brought to the notice of Lord Alverstone, Mr. Andrew Lang, and the Head Masters of Eton and Haileybury. The Lord Chief Justice entirely disagreed with the views expressed by Dr. Kenealy. Mr. Andrew Lang thought that perhaps Miss Kenealy did not know much about the matter, and he added that very clever as well as very stupid people were good at games. The Head Master of Eton gave laconic replies from which little is to be gathered. The Head Master of Haileybury said that he had very little doubt that successful athletes were no more likely nor less likely to say and do stupid things than other people. He also said, "It is, of course, rare that a very first-rate athlete is intellectually first-rate, but this only means that very few people absorb all the best of Nature's gifts." I mention these observations by way of introduction to a brief discussion on the relationship of physical to mental exercise in childhood.

There are certain common-sense facts which have, of late years, been rendered capable of exact measurement by psychological methods of research. I allude to the relationship of fatigue to mental reaction. These facts are: excessive physical exercise retards mental activities, and *vice versa*. These statements apply not only in relationship to immediate cause and effect, but their applicability may be exemplified over a considerable period, or even over the lifetime of an individual.

The researches on fatigue conducted by Professor Mosso, Sir Michael Foster, and Francis Galton emphasize the fact that strength is lessened by continued effort, even in moderate degree. In spite of the difficulties attending an investigation of the effects of fatigue in the brain, it is now definitely ascertained that excessive muscular effort lessens or even abolishes the sensory power of the cerebral centres. The products of muscular activity affect the brain as well as other tissues of the body. Cerebral action is involved in all exercise. As Sir William Gowers quite recently stated "School games involve a wide range of brain activity. Most of the senses are called into action; comparison and judgment are needed, and the sources of nerve activity are more or less exhausted. The double influence of games, the demand on brain and muscle, and the hindrance to each which results from the products of their action, enable us readily to comprehend the failure of the cricketer's dexterity after a long day's play, and the inability of the schoolboy to work well after hard exertion." He also adds: "It is not reasonable to expect mental work to be well done after exhausting muscular exercise. With brain work the nervous elements generate their own products which hinder activity, and with true brain fatigue there is not only exhaustion of power in the nervous tissues, but there is also a lessened power of maintaining muscular action." Mosso's observations with the ergograph have clearly shown this fact, and the imperfect attention of pupils so frequently recorded as evidence of brain weariness is simply an expression of imperfect brain power resulting from over-exertion. It is also interesting to note that the researches elicit the fact that brain fatigue commonly induces a failure of memory and of the power of grasping a subject.

The results of the development of a habit of taxing the capacities of the circulatory apparatus in one region of the brain to the partial exclusion of other regions is exemplified in the life history of the athlete on the one hand and of the bookworm on the other; and physical or mental exercise when indulged in to excess, and not rendered complementary the one to the other, may in the long run prove baneful to the mental or physical health of the individual.

We all know that physical exercise implies not only increase of waste and repair during, and

immediately after, the period of exercise ; but there are also various after-effects, as evidenced by stiffness, lassitude, etc. These after-effects are usually in proportion to the nature and amount of exercise taken (whether the exercise taken be one isolated effort or the repetition of an effort, as when in "training," does not interfere with the contention). To counteract or get rid of the after-effects nothing is so efficacious as further effort effected judiciously, until the organism becomes, so to speak, fully trained. This implies the cultivation of a habit of exercise with its equally important habit of waste and repair. Now, unfortunately, the cultivation of any such habit of body or mind cannot be undertaken with impunity. Cessation or interruption of the habit is not always followed by a corresponding cessation or proper adaptation of the processes of waste and repair, and there is apt to be a retardation of these functions, leading to cumulative effects of waste, and anergia of the recuperative activities. This means that the cultivation of habits of exercise in varying degrees during the earlier stages of physical development necessitates their continuance in proportionate degrees through life ; otherwise the physical organism suffers from the effects of cumulative waste. It is almost a truism to say, "Once an athlete, always an athlete" ; and what athlete can gainsay the fact that his early training and habits of active exercise have imposed upon him a tax—a tax of exercise—without payment of which he is unable to maintain health ?

As it is with bodily exercise, so it is with mental. The mental activities of attention, cognition, memory and reasoning are attended by processes of waste and repair in the cerebral tissues proportionate to the amount of mental exercise involved. When the amount of exercise has been excessive, it is apt to be followed by lassitude or mental "stiffness." This mental stiffness may after an interval be overcome by renewed effort until a condition of mental training be acquired ; but just as in the case of a physical habit, so may a mental one of application and concentration be developed which may remain, not only as a habit, but as a demand through life.

The individual who strains his heart, his lungs, or other organs during early life feels the effects till the end ; and—to use a slang expression—is compelled to "take it easy." So it is with the person who by excessive strain of his mental faculties in early life finds that his brain is not as good as it

was, and finds it advisable to "go easy" ; and this is becoming a more common experience in daily life. The individual who has undergone a too early and excessive mental strain finds himself at a comparatively early age suffering from one of the numerous forms of asthenia, neurasthenia, cerebrasthenia, or phrenasthenia, all of which mean the same thing—exhaustion from too early and excessive use of functions which ought in the life history of the individual to have developed more gradually and at a later period. Needless to say, we alienists have to face these results in ever-increasing abundance, and in adult life the inability to "go easy" has necessitated continued effort by brains which have already run their course well on towards disaster, mental wreck, and the wards of an asylum.

Certain it is that this is an age of too early and too rapid mental growth—I will not say mental development, for reasons to be given presently. The demands of this brain age are such as to necessitate too early and too severe taxation upon the resources of the brain, and the effects are becoming more and more disastrous. Those who are fortunate enough to survive this overstraining in youth and are able to continue their mental development through life are to be congratulated.

Excessive physical exercise in childhood and youth only too frequently engenders the seeds of physical ailments which are felt throughout a lifetime. If there be not actual tangible effects of strain upon one or other organ or even actual arrest of development, there is evolved a weakness which manifests itself later in life when a tax is put upon the mental or vital energies. What more common than the weak heart of the former athlete, the atheromatous arteries, and all the ghastly array of cerebral degenerations, and even apoplexies ? For the sons of toil rheumatism and independence come upon them at the same moment. So it is with riches, both monetary and intellectual : how frequently are they accompanied by paralysis, the melancholy *finale* of a life of toil !

I would here assert that the enormous increase in insanity, weak-mindedness, functional neuroses, neurasthenia, cerebral degenerations, and the like, are often to be traced back to an intemperate exercise of the brain functions (in both psychological and motor regions) during the earlier periods of development, when greatest care and moderation is necessary.

My custom is, when seeking a cause for cerebral failure, to inquire into the mental and physical life-histories of the individuals, and (specific and accidental causes being excluded) I seldom fail to find that the energies have been dealt with intemperately at some earlier period; and where there has not been actual breakdown to serve as a warning there has been developed a predisposition to succumb to the stress and strain of a more adult life. This is one of the explanations why it is that mental and cerebral diseases tend to appear at an earlier age, and, more important still, why their character is more severe and less curable than formerly. We know with certainty that various specific affections of the nervous system occurring in youth render the whole nervous system less plastic, less adaptable to sudden or incidental stress, and less capable of regeneration when the exciting and deleterious circumstances are removed, and I believe there is no more insidious or farther-reaching cause of a similar life-tax on the individual than that of over-education.

I agree with Dr. Moore Madden that the mental training of youth and early puberty is a question of paramount importance. We are all agreed as to the duty of suitably educating the young so as to fit them for the daily increasing requirements and competitions of modern life, but as to the extent to which this should be carried in early childhood there is, unfortunately, a great discrepancy between the doctrinaires of the Education Department and the views of those who have any knowledge of the laws of nature, or who as physicians have to deal in disease with the consequence of their violation. The red-tape officialism of the former is often supreme over medical experience. And hence, whilst children, before the age of puberty, are thereby overworked into disease or death, the physician must still raise his protesting voice.

"The first years of life should be mainly occupied by moral and physical training, and during this period the amount of mental cultivation which a child's brain is capable of receiving with permanent advantage is much less than is commonly believed. No greater physiological mistake is possible than the prevailing idea of attempting any considerable degree of mental culture until sufficient development of the physical stamina and moral faculties be established. The organ of the mind is as much a part of the body as the hand, and ere either can

function properly its vital force must be developed and maintained by nutrition.

"Hence arises a very important practical question in connection with compulsory elementary education. A large proportion of those who must come within the provisions of the law in most large cities are ill-fed children of the poorest classes, and children thus debilitated by privation are necessarily as much incapacitated for any mental strain as they are for the accomplishment of any feat of physical strength, and I am by no means alone in saying it is inhuman, injudicious, and impolitic to expect the fulfilment of standard requirements by children so circumstanced.

"It has been said before, and it must be insisted on again, that if the State, for reasons of public policy, determines that all children shall be compulsorily educated from their earliest years, it should certainly afford the means by which this may be least injuriously and most effectually carried out, by seeing that sufficient food as well as education is provided for every pauper child compelled to attend school."

We have but to turn to the Report on the results of over-pressure in schools by Sir James Crichton Browne to have convincing proof of the existence of all forms of cerebral disease—cephalitis, cerebritis, meningitis, as well as headache, sleeplessness, neuroses of every kind, and other evidence of cerebro-nervous disorders. Dr. Moore Madden, writing on the pathology and hygiene of puberty, also sounds a warning note. He says it would be difficult to over-estimate the pathological consequences of thus directing all the available energies of the system to the brain during early youth, to the irreparable injury of the over-stimulated cerebral organisation, and at the expense of the other functions and organs of the body. The deterioration of the physical and mental stamina so often observable is mainly due to the fact that a large part of the first years of life, which should be primarily devoted to religious or moral as well as physical training, is now given up to the development of mental powers. The child is too early compelled to attend some school where the immature brain is forced into abnormal and disastrous activity.

The question of feeding the school children is no new question. The managers of the Board Schools are always faced with the problem. I

read quite recently that as a result of visits made to the homes of forty children, reputed to be under-fed, the manager of a South London Board School struck three-quarters of the names off the free list, and that he felt not a little disgusted with the deceitfulness of human nature. According to him the usual attitude of the mother, when there are rumours of free meals, is that "if there is anything 'going' she would like her children to be 'in it.'" When the managers decided not to advertise their free dinners, but to wait for applications, no applications came, and consequently no dinners were given, and the officials were led to the conclusion that it made no difference to the children. Undoubtedly free food may be dangerous to a certain extent. It would be cheaper to the ratepayer were it discontinued now, but it would be false economy in the long run, for the money saved would have to be expended fourfold later on to maintain the wards of an asylum.

No problem of education is so little understood as that of memory. I will introduce the subject by repeating some remarks contained in an address recently delivered at the opening of the Medical Faculty of a university. After repudiating the terms "graduating machines," "knowledge shops," as applied to the universities, the speaker stated that he regarded it as an excellent thing for a boy or girl to delight in omnivorous reading, to acquire the art of learning quickly, of discerning the main and important points to be understood, and to form fresh and tenacious receptacles for every new branch of knowledge. "It is well," he said, "that by an honourable ambition young men and maidens should be willing to scorn delights and to live laborious days in the hope of attaining the fair garland which adorns the learned brow," etc. At the conclusion of this remarkable address the following advice is given: "Cultivate your memory; form the habit of recalling things at the proper time, and make provision for spare minutes in the day or sleepless hours at night by fixing poems in your memory, or by repeating the geological strata of England, the atomic weights of the elements, the heights of mountains, or the dates of the decisive battles of the world. Never fear filling your mind too full of fresh knowledge, or suppose that one fact will displace the other, as water poured into a full vessel adds nothing to its contents; for the more the mind receives the more it will contain,

and there is no limit (or none that we ordinary people can see) to the growth of knowledge so long as life endures." Such advice as this appears to be the guiding rule for many who have under their trust the moulding of the minds of the rising generation. I would ask the question: "Can we increase the physiological retentiveness of memory?" The answer is simple: Yes, it can be increased, that is to say, the memory can be made to hold more; but the cost is in inverse proportion to the inherent capacity of the individual. We can train a stomach to hold more. We can dilate it; but a system of dilatation by nuts and dates is apt to be followed by dyspepsia and atony. The pauper classes, best fitted for the agricultural, or even technical, pursuits, are, as a rule, ill prepared constitutionally for the imposition of a tax upon their brain-cells, and the compulsory drain upon an already meagre soil is followed all too soon by barren results. I believe that for the physical and mental welfare of our race such an imposition as compulsory education should be withheld from, at least, one half of those who are now undergoing sentence in board schools.

There appears to be much difficulty in the minds of the authorities as to what is really required. Do we want knowledge, wisdom, or mental health in the rising generation? Undoubtedly least regard is paid to the prospect of mental health, and wisdom is held as of little value as compared with knowledge. This "knowledge" is the test *par excellence*; it is the guiding factor in competitive examinations; it seems to dominate the minds of the instructors and the careers of the instructed. It is pursued at the expense of reasoning, and even sanity, and upon it is based the standard of the so-called intellectual advance of the nation. Upon it is also based the statistics showing how with the rise in education there is a diminution of crime; and, in fact, it is the miserable fetish which animates the public and its legislators. This is, undoubtedly, a brain age, but it is an age when brains are forced to grow at the expense of development. It is not an age of thought and reason, but one of remembered facts and transmitted ideas.

An investigation of the original capacities of an insane individual almost invariably gives a clue to the whole nature of the case. Thus, for example, it is common to meet with an individual who at the

period of puberty or of adolescence has broken down mentally, overwork being assigned as the cause. The friends tell you that, as a child, the patient was precocious and possessed a marvellous memory. This excessive physiological retentiveness had in reality been the leading feature in the case. The parents in their satisfaction at the possession of a child so apparently intelligent, not only sanctioned, but even encouraged, an undue amount of mental cramming, with the unfortunate result that the whole brain and mind have suddenly become a wreck. This possession of abnormal retentiveness of memory may serve to explain many of the early victories as students and later failures as men. The number of patients who, at puberty, adolescence, and even adult life succumb and become fatuous, weak-minded, and demented is ever increasing. Formerly acute mental disorders, such as acute mania, were frequent; nowadays the adolescent is weak-minded, suffering from dementia precox, hebephrenia, and other forms of dementia, all of which are mainly the products of the last few decades. These individuals with minds endowed with a limited capacity for growth and development have had their brains plastered with barren facts until all that is left of mental life is evidenced by delusions, irrelevancy, or imbecility. Then what of the hordes of men of learning, so-called? I refer to those stodgy, ponderous, swollen-headed individuals who have grown at the expense of development. In spite of their medals and scholastic attainments they go down the river of life as over-ballasted barges; or more commonly they are to be seen grounded in the mud of their own shallowness.

Civilisation is very old, but there is little or no evidence that either mentally, morally, or physically has the race varied greatly in the thousands of years recorded for us. In the remote ages there existed libraries, architects, sculptors, carvers, miners, metal-workers, and even plumbers, who in their work differed little from those of the present day. Our introduction to the human race is to a race fully brained and fully armed. The temples, the sculpture, the poetry, the drama, the philosophy, and the religion of those remote periods had behind them unknown and uncounted centuries of a relatively high civilisation. Athens, with all its poets, philosophers, heroes, and gods, shed a light on the intellectual history of the world—a light

that has but been added to by new methods and conceptions which we group under the vague name of "science."

The apparent marvellous advance of late years in no way implies any corresponding advance in the natural powers of the human mind, and I doubt if another thousand years will reveal anything but a decay of the majority who drop out of account. Synder has asked the question, "Whence come, then, the great strides of the last ten or twelve generations? The cause may be summed up in a word—the invention and use of mechanical appliances. Under mechanical appliances may be included all that contribute to exact measurement and to the extension of our primitive senses in any direction whatsoever. All these have made possible investigations and stimulated research, and are, undoubtedly, the pillars of modern science and of modern civilisation, without which our intellects would be without their artificial means of support. Progress of science in the future is to be sought in the discovery of simple mechanical laws pertaining to matter, life, and mind. Observation must be the order of the day for advance in knowledge, and the scientific organisation of industry must be the key-note for the culture and intelligence of the race. The vast majority of the products of education are mere quotations: and how many individuals do we know whose ears are but as inverted commas, or quotation marks, for what is contained between them. As Flexner recently pointed out, the preparatory schools are awkwardly placed or hedged in, so to speak, so far as their scope is concerned, by the higher centres, which demand a stated knowledge of stated subjects of all who wish to enter their portals. The preparatory schools for universities and colleges are little preparatory in relation to the battle of life. In other words, the standards set by the higher centres are those which the preparatory schools must needs work up to.

Flexner points to literature and science as showing the worst effects from having knowledge administered in concentrated lumps, without selection or discrimination. The pupil must swallow the useless with the useful.

The question of rural depopulation depends in great part upon the facilities offered for education in country districts, but unfortunately, the nature of

that education is, as a rule, little designed to fit the children for an active or even intelligent management of the land which to them means health, vigour, and sanity. The absurd and, one might say, culpable mistake of frittering away a child's chances of success in the work for which he was destined by heredity and environment by a so-called all-round method of education which in most instances consists in a smattering of useless knowledge, does more to destroy concentration and a right direction of effort than would absolute neglect of all education whatsoever. This method of standardising brains has been referred to by Cornish, who says that "the present educational system does not give the children the chances it is supposed to give. It gives them sufficient 'literary' facility to enable them to struggle through life on starvation wages in some dingy business house, but it certainly does not open up very much wider possibilities. And, again, why force them to undergo this commercial kind of 'teaching' in preference to agricultural? We have yet to learn that there are moral, physical, pecuniary, or social advantages in the clerk's or business drudge's life which are unattainable by agricultural workers. To teach one subject, and that a large and very important one, thoroughly, would seem to be a decided improvement."

This question of educating children to retain more than their natural endowments or capacities will allow is nowhere more exemplified than in rural districts, where a little knowledge sets alight an ambition to migrate from the soil, which alone can enable men to survive, to cities where they enter into an unequal contest and a kind of civilisation characterised by the consumption of bad gas, aerated bread and cigarettes. This is not mental hygiene: it is the commonest of all steps in the direction of mental decay; and the accidents of civilisation, such as alcohol, disease, and incidental stress, or strain, find in them merely the readiest victims.

And now I wish to speak of the mental state most prevalent at the present day, and in my opinion mainly attributable to faulty educational methods. It is one of "psychorrhœa," an affection characterised, in the learned, by a plethora of facts, theories, and ideas, with vitiation of instinct, reasoning and common sense, and which may aptly be termed "Psychorrhœa gravis." In the less educated classes psychorrhœa is characterised by a

state of dreamy or diffuse consciousness, a running on of impressions, ideas, and remembered facts, in an incoherent stream of thought. They have eyes, but do not see; ears, but do not hear. Their minds are dependent upon the insipid and tasteless mental diet of railway bookstalls, trashy novels, police news, gossip, etc. They taste of the sweets of each dish in turn. Their mental appetites are exhausted, their digestion *nil*. They glance at the mental food provided for the nation and obtain a "cumulation of traces," which is nothing but a form of incoherence closely allied to insanity. The transition from such a state to that of actual insanity is very slight, and the disease begins with faulty habits of selection and assimilation in childhood. Facts and fancies pass in rapid review from the beginning to the end of life. They construct nothing; they add nothing either to themselves or to the mental vigour of their progeny, and they and their progeny pass into oblivion by reason of their mental state of "Psychorrhœa insipida." There are many other varieties of this malady to which time will not allow me to refer. I merely repeat that it is due to faulty methods of education in childhood that such a state of affairs exists; and that it does exist anyone who has the mental health of the community at heart will only too readily bear testimony.

Nowadays, when everything around us seems to bear the impress of intellectual advance, we may readily be deceived; but there is one great law known to physicians, viz: Loss of function is almost invariably preceded by exaltation of function. Anæsthesias are preceded by hyperæsthesias, amnesias by hypernesias. In plain words, there is a flickering of the candle before the light goes out. Thus I see in the precocity of the infant the dementia of the aged; in the mental exaltation of the classes an atony of the masses, and in the enforced activities of all the paralysis of all. The question of the age is not "Do we give our stomachs too much to do?" but "Do we give our brains too much to do?"

Psychological methods of testing the power of retention by the memory have taught us that the brain is more receptive in the mornings and that the power diminishes as the day advances. The lesson to be gained from this is important and far reaching, and studies should be based on this elementary fact in regulating the strain to be put

upon the infant mind. There is, indeed, much to be said about the physiological order of studies, but I refrain. I merely call attention to the fact that in consequence of faulty methods of acquiring data in the memory this faculty is nowadays one of the earliest to show signs of decay. At a comparatively early age most individuals find that their acquisitive powers fail them, and if their constructive powers have never received attention sorry is their lot indeed. All the cases reported in the newspapers of sudden transitory or permanent loss of memory fall into the category of the hystero-epilepsy advancing upon the nation, and form another evidence of a degeneration which is almost irretrievably hedging us in.

I would now like to refer somewhat briefly to a question that has long agitated the public mind. I mean the question of the relationship of religion to education, and I would preface my remarks by stating that the mental hygiene of childhood is not to be determined by any special denominational method. Such limited methods may result in the fixity of an idea or belief quite compatible with usefulness in any sphere of activity, but they do not deal with the broader and deeper question of the preservation of the mental health of the individual. The exaggerated importance of the denominational question which engendered passive resistance ought to give way to the question of mental health and engender a strong and active resistance to all that tends to narrow or circumscribe the mental life of the individual infant. I believe it to be our object as teachers and physicians to fight against all those influences which tend to produce either religious indifference or intemperance, and to subscribe as best we may to that form of religious belief, so far as we can find it practically embodied or effective, which believes in "the larger hope," though it condemns unreservedly the demonstrable superstition and sentimentality which impede its progress and power. As one whose whole life has been concerned with the sufferings of the human mind I would state that, of all the hygienic measures to counteract disturbed sleep, depression of spirits, and all the miserable sequelæ of a distraught mind, I would undoubtedly give the first place to the simple habit of prayer. Let the child be taught to believe with the theologian in an anthropomorphic God the Father, or with the philosopher in an all-pervading medium of guidance

and control, or with the scientist in the integrity of a cosmic whole, with its transmutations, evolutions, and indestructibilities. It matters little, for they all lead in the same direction. Let there but be a habit of nightly communion, not as a mendicant, nor repeater of words more adapted to the tongue of a sage, but as a humble individual who submerges or asserts his individuality as an integral part of a greater whole. Such a habit does more to clean the spirit and invigorate the mind to overcome mere incidental emotionalism than any other therapeutic agent known to me. Our schools are as gardens for cultivating, judicious pruning, and sustaining young life by gardeners who have, or who ought to have, full knowledge of the tender plants under their care. Our churches are to the moral welfare of the community as our schools are to the intellectual. The Church has been aptly termed "God's Garden," where the art of living good lives and making of character is helped by specially appointed gardeners. It is needless to say, however, that the light of reason or sanity as bestowed upon us by nature is the light to which all other considerations must give way, lest the future generations pass all too soon the borderland of knowing things as they are.

Such, then, are a few of the points that have occurred to me in connection with the economic management of brain power.

I would point out that our own daily habits as to work, rest, and sleep are unphysiological and a source of danger to our offspring. We turn night into day, and where this evil most exists there we have the most marked evidences of insanity. Why should there not be a complete revolution by which their eyes, their brains, and their minds may be saved by habits of ours which are more in conformity with nature? Were our theatres, concert halls, dancing saloons, and other places of amusement to be closed by 10 p.m., our habits of feeding and working would be forced back to earlier hours. In fact, we are two hours too late every day. Were this fashion set and grown accustomed to, it would be hailed with delight as one of the most sanitary of reforms, and the benefit to the race would be incalculable. As it is now, the hours of greatest energy and vitality are given to restoration of nerves jaded and worn by ceaseless attempts to thwart nature. I believe that a strong effort in this direction would result in a complete reorganisation

of our modes of life, it would tend to restore the equilibrium which is now tottering, and the consequences to our civilisation would be rendered less appalling. Now, ladies and gentlemen, do not let it be for a moment supposed that I am an advocate of neglect in the matter of education. My contention is that the mind of the so-called civilised race is having an artificial and disastrous strain enforced upon it. This is brought about by a too early, a too severe, and a fundamentally bad system of cramming. Selection is the very keel on which our mental ship is built, and for those who are not allowed the privilege of an able or wise direction in the economic management of brain power let us hope that the not unmixed evils of a bad memory may save them from a fate not unlike that of an over-fed goose. Over-fed geese, by the way, are profitable for those who direct their stuffing, they furnish tasty and indigestible morsels for the greedy, but the result, although good for the former, is bad for the latter, and decidedly bad for the goose.

Lingual Goitre.—Henry R. Storrs concludes that lingual goitre is a tumour at the base of the tongue, arising from an accessory thyroid gland which may be found in the course of the development of the thyroglossal duct. It has all the characteristics of ordinary goitre. It occurs almost exclusively in women between the ages of fifteen and forty. It grows slowly, and may exist for years without causing any annoyance, until some unknown cause stimulates its growth and produces symptoms. These are functional and not constitutional, and consist of trouble in swallowing, breathing, and speaking, accompanied by frequent hæmorrhages. The tumour is round or ovoid, elastic, and covered with a very vascular mucous membrane, and is almost never ulcerated. Dermoid cyst offers the only difficulty in differential diagnosis, but this is generally yellow, grows rapidly, pits on pressure, and has not the vascularity of goitre. Operation is the only radical cure. There are two ways of reaching the tumour, namely, through the mouth and through an incision in the suprahyoid region, the former being the best. The prognosis is good. —'Medical Record,' vol. lxvi, No. 20.

THREE LECTURES ON SOME INJURIES AND DISEASES OF JOINTS.*

By F. C. WALLIS, F.R.C.S.

LECTURE I.

GENTLEMEN,—The subject taken for these lectures is one which has not been discussed for some time in the class of lecture which is usually given at this institution. On looking through the various subjects which have been placed before you it becomes evident that abdominal surgery in some form or other has occupied in the main the bulk of the time allotted to lectures on surgery; and although I am the last not to recognise the all-important position now occupied by the surgery of this region, it does not seem right that other regions should be so much neglected as they have been of late.

Surgery has advanced not only with regard to abdominal work, but also, and materially, in connection with the surgery of the joints, and it is probable that the advances which have been made are not so well known as they should be because of the want of publicity and repetition which is really necessary before any new facts are sufficiently appreciated by the medical profession to put them to a practical use. It would be impossible in three lectures to attempt anything like a complete account of the various joint troubles. What I propose to do is to deal with such points as may be of practical use, and to discuss the advances with which I am personally familiar in connection with this region of surgery, but it must not be supposed that it is in any way a complete account of the various advances and improvements which have taken place in connection with joint surgery. I propose to discuss first the injuries and diseases of some of the small joints.

Injuries to phalangeal joints and joints of the hand generally.—It is not uncommon for patients to come to me with the history of some recent injury to a finger-joint which has been treated by being placed on a straight splint upon which it has been immobilised for a week or longer, with the result that the whole finger is stiff, and although

* Delivered at the Medical Graduates' College and Polyclinic, November 9th, 16th, and 23rd.

the original injury may have been benefited by the rest, it is some time before the various joints of the finger resume their normal movements; the process of obtaining this is a painful one for the patient. This is a small point, but one which undoubtedly should be altered in the treatment of injuries to small joints. As a general principle it may be stated that all joints are best rested when in a position of natural ease, and this particularly applies to the joints of the hand. If any of you will extend your fingers to the utmost, keeping them there for a short time, and then let them relax into the natural position of rest, which is one of semi-flexion, the relief of the altered position will at once be apparent. If an injured finger-joint is placed on a straight splint it will be found, as already suggested, that the ligaments, tendons, and all the peri-articular tissues rapidly contract, and according to the length of time which the finger has been on the splint so proportionately will the length of time be when by forcible movement, which is quite painful, steaming, rubbing, and passive movements, the normal action of the fingers are restored.

Let us remember, then, that all injuries of the finger-bones and joints should be treated upon the principle of the joint being in a position of natural rest, that is, semi-flexion, and this may be obtained by a malleable metal splint, or often no splint is necessary, and a roll of wool or a bandage placed in the palm of the hand over which the finger may be bandaged, is sufficient. At the end of a few days the finger is taken down and moved, and when the joint is sufficiently recovered to be able to do without the support it will be found that the natural movements can be carried out without pain and with practically no stiffness. The only injury which permits of a straight splint being applied to a finger is the division of one of the extensor tendons of the finger.

Fractures involving joints.—A certain number of fractures which involve joints require special treatment, notably Pott's fracture, Colles' fracture, and fractures of the olecranon and of the patella. Other fractures of long bones which may involve the joint do not need a special mention here, as they are treated on general principles, the only difference being that whenever possible the joint is moved after about ten days. Although many improvements have taken place in connection with

Pott's fracture it still remains one of the most unsatisfactory in its results in spite of every care. This is unsatisfactory in every way. It is difficult for a patient to realise that one fracture is more difficult than another with regard to obtaining a good result; and the unsatisfactory result which is only too common in this fracture nearly always reflects on the individual treating it; and I believe it is a good policy in this instance, and also in the case of Colles' fracture, to definitely warn the patient as to the possibility of an unsatisfactory result, and then if the reverse happens, there is as much satisfaction in the one case as there would be the reverse in the other. The main difficulty in Pott's fracture is not so much the fracture of the fibula as the injury done to the internal lateral ligament or the internal malleolus of the tibia.

If the displacement of the ankle-joint can be overcome and the ligament or malleolus as the case may be is made good, then the best results may be obtained; but it is of little use wiring the fibula unless the displacement of the ankle-joint can be definitely overcome. A few years ago I had under my care two cases of this fracture which I operated on within a few days of each other. In the one I wired the fibula and in the other I left the fibula alone, opened the ankle-joint over the internal malleolus, and was fortunately able to attach the fractured malleolus back in its place. The result of these cases was most instructive. The one in which the fibula was wired recovered with a typical deformity which usually accompanies this fracture. The other patient made an admirable recovery with no deformity at all, only a slight thickening round the ankle, which gradually disappeared. I would, therefore, urge that the main point in the treatment of this fracture is to deal with the injury to the inner ankle. If this is overcome, it may not be necessary in any way to interfere with the fibula; but there is one thing that must always be done in these cases of fracture injury about a joint: viz. the joint in question should be X-rayed by an efficient man, otherwise some important malposition or other lesion may be overlooked. I cannot emphasize too strongly the great need there is for a radiograph to be taken in such cases both as an aid and also as a protection.

Fractures of the olecranon should always be wired unless there are some exceptional circum-

stances forbidding it or rendering it unnecessary. The value of wiring the olecranon is well illustrated by the following case, which was published some years ago by me in one of the journals. An old man of some seventy years of age fell down and broke his left olecranon and the right ulnar, with the result that he was completely helpless and unable to do anything. Having regard to his totally helpless condition, I determined, in spite of his advanced age, to wire the olecranon, with the result that in three days he was feeding himself, and after a week he was able to use his left hand and arm quite freely, whereas in the case of the right arm it was a month before he was in any way able to use it.

All fractured patellæ should be wired except when the separation is only half an inch or less, or when the patient's condition or surroundings should render the operation inadvisable; but to my mind these cases are but few, and I think it only right that in cases where there is some doubt on the patient's part as to whether to have the operation done or not the advantages of the operation should be clearly put before him. The one risk is, of course, sepsis, and if this does occur when a knee-joint is wired, it is a most distressing disaster; but unless one can be sure of the surgical cleanliness of the surroundings the operation should not be contemplated. The question as to how soon after the injury a bone should be wired is one upon which different views are held. I, personally, cannot see the advantage of waiting for a week, as is the common practice with many before doing what is necessary. The shock of such an accident as fracture of the patellæ is not great; and unless it has been caused by direct violence, which is quite unusual, no damage to the skin or bruising of the superficial tissues will take place; and if within twenty-four or forty-eight hours the bone is wired it is much easier to wash the joint free from blood-clot and to clear the two fractured ends of the bone, which, when seen at the end of a week are not only enveloped by the torn aponeurosis, but blood-clot has become quite firmly attached to the fractured surfaces and is removed with some little trouble. As the main object of the operation is to get good and speedy union, there is no point in wasting a week before the operation. When the fracture is exposed a small drill should be passed through both fragments, care being taken

not to encroach upon the cartilage. Quite thin wire is sufficient for the purpose of fixing the patella, and the great thickness which has often been used at this operation accounts, I believe, for some of the troubles which have occurred in connection with it. The other points of interest in this matter are that lateral movement of the patella should take place on the third day, and passive flexion at the end of a week. In the case of the olecranon the movement can be commenced the day after the operation.

Wounds of Joints.—Wounds of joints require a special and urgent treatment, and the diagnosis in these cases is one of great importance. Apart from bullet wounds, which I do not propose to discuss, the joint mainly wounded in civil life is the knee-joint; and as the general principle in the treatment of all joint wounds is the same I propose to take the knee-joint for the purposes of detailing the points in the diagnosis and treatment in such cases. When the wound is a wide one and the synovial fluid is seen coming from the wound there is no question as to the diagnosis. But when the wound is a small one, such as may be made by a penknife, a pair of scissors, or the opening into the joint is some distance from the external wound, the diagnosis may not be so easy. When a doubtful case occurs it would of course be useful in diagnosis if a probe could be passed into the joint; but the possible disadvantages of this are obvious. At the same time, if one is prepared to go straight on and operate if the joint has been opened there is no harm in probing to ascertain. The other indications of a perforation of the joint are distension of the joint out of all proportion to the synovitis, which might have been caused by the accident if the knee-joint was not involved, and a rise of temperature which very rapidly occurs in these cases, probably due to distension of the joint. There is no question as to the treatment: the joint should be opened and thoroughly washed out with saline solution. The injured tissues in the line of the wound should be cut away or treated with some strong antiseptic solution before the joint is investigated. It is safer in those cases to leave a drain for two or three days, at the end of which time it may reasonably be supposed that the joint will be safe from suppuration. Should this, unfortunately, not be so, then incisions must be opened up, enlarged, and proper drainage systematically carried out.

Suppurating corns involving joints.—Another small matter which I have seen on various occasions cause considerable and even serious trouble is a suppurating corn over or beneath a toe-joint, notably the fifth or fourth toes being the most common. In these cases there is often a small collection of pus between the corn and the joint, and this septic condition soon spreads into the tissues around and even to the joints. When such a case comes under the care of a medical man the inflamed area should be at once incised, the pus let out, and under an anæsthetic it should be carefully investigated as to whether the joint has been affected or not. If this is so—and usually it is the case—it is much better to at once amputate the toe and not attempt by draining to save it; the drainage can only be imperfect, the process of recovery must necessarily be long, and the ultimate result—namely, ankylosis—will always be a source of trouble to the individual concerned. When amputating through a joint under such conditions of septic inflammation of the surrounding tissue, it cannot be too emphatically stated that on no account whatever, no matter what joint it is, should any attempt be made to bring the flaps together. In fact, the best treatment is to keep them separate by packing between them some antiseptic gauze. In the case of the toe, the foot should after the first twenty-four hours frequently be placed in a boracic bath for at least an hour. When not in the bath a boracic fomentation should be applied over the surrounding area, and this treatment should be steadily persevered in until all indications of inflammation have passed away and the tissues assume a soft, healthy, granulating appearance which is well known to all of us. It can then be treated like any other granulating wound. If by any unfortunate chance the tissues are brought together, disastrous results occur. Perhaps I can best illustrate this by the following case which came under my care. The patient had a corn under the sole of the right fifth metatarsal joint. This was treated with caustic, it became inflamed, the inflammation spread to the surrounding tissues. Matters went from bad to worse, and eventually the toe was amputated, and the flaps were brought together. The inflammation continued; the dorsum of the foot became involved in the process. Various forms of treatment were carried out for five months. At the end of this time the

patient came under my care having an unhealthy undermined wound on the outer side of his foot leading down to the head of the fifth metatarsal bone, which was bare and necrosed. I removed this necrosed bone, scraped all the surrounding tissues, and swabbed them freely with pure carbolic acid. After forty-eight hours the foot was constantly kept in a boracic bath, and this treatment it was necessary to pursue for weeks, until gradually the tissues assumed a healthy aspect; and to make a long story short, after six months' further treatment, making practically a year in all, this patient was able to get a boot on and walk without pain. This may have been an exceptional case, as the patient had been through the recent South African campaign and was not in the best of health when originally treated. But the main lesson to be learnt from it is that under no consideration whatever should the flaps of an amputation through infected tissues be brought together. As long as there is a free drain for the serum, which you will remember flows with great rapidity from cut inflamed tissues, such a result can only be of benefit to the affected tissues, but if this serum is in any way pent up it acts as a receptacle for the cultivation of the various micro-organisms in the tissues.

Hammer-toe.—Another common trouble with the toe is hammer-toe. This is a defect, either congenital or acquired, which when present is a source of continued pain and annoyance to the possessor. When congenital it is often symmetrical. I do not propose to discuss the pathology of this complaint, as these lectures are meant to be of a practical nature. Genuine hammer-toe means a dislocation of the inter-phalangeal joint, and no orthopædic apparatus ever invented can alter this, as with it there is a relative shortening of the flexor tendons and of the ligaments. The second toe is the one usually affected. Amputation in these cases is commonly resorted to, but it is only in quite exceptional cases that such a treatment is warranted. The amputation certainly does away with the hammer-toe, but it also produces a considerable gap in the spread of the toes, and as in many of these cases there is a tendency to hallux valgus, this tendency is greatly increased by the space caused by the amputated toe. On general principles it is not good surgery to remove any digit which can even in a modified form be of use if retained, and this applies to a large percentage of cases of

hammer-toe. The following is the treatment. Any thickened skin or corn which commonly exists in a long-standing hammer-toe is excised by an elliptical incision in the length of the toe. This incision is sufficiently prolonged to expose the extensor tendon. The tendon is then split longitudinally and the affected joint becomes at once exposed. The split tendon is held apart and the head of the proximal phalanx is cleared and removed with bone-forceps. Care must be taken in doing this not to divide the split tendon. The cartilage on the proximal side of the other joint is not touched, the skin is sewn up and the toe placed on a splint. The foot is kept at rest for a week, when the stitches are removed and the splint left off. In about a fortnight the patient is able to walk in a soft shoe, and from then on the progress is one of rapid recovery. I have done this operation now for some years, and have been able to watch the effect years after. The result has been as good as could be wished, and when I say that nurses and soldiers form a fair percentage of the cases it will be understood that the test has been quite a sufficient one.

Hallux Valgus.—This is a common deformity, especially in young women, and is probably due to badly-fitting boots. Other causes, however, may produce it, but this is mainly the fault. Slight cases can be overcome by an arrangement of elastic bands, which I now show you, and which fits over the toe and round the foot. It must be worn for some considerable time and the necessary alteration made in the shape of the boot. When the deformity is once well established no amount of apparatus can alter it, and there is only one thing left to do, and that is an osteotomy through the bone below the head. It is in quite exceptional cases that the removal of the head of the bone can be considered advisable, and even then the result will not be particularly pleasing to either the operator or the patient. The value of the head of the metatarsal bone of the great toe cannot be over-estimated. At a certain point in every step that is taken the head of this bone is the main element in the tread, and the whole weight of the body comes on to it, and from it the spring of the walk originates. The importance of this bone has not, as a rule, been sufficiently appreciated. The operation of osteotomy is carried out as follows: an incision is made down to the bone on the inner

side of the foot and the bone is exposed. It is sawn through just below the head by a wire saw, or some other small saw. The wire saw is the best, but there is occasionally a little difficulty in passing it round the bone. The best plan is to thread a piece of silk on a well-curved aneurism needle and pass this round the bone, fastening the other end of the silk to the saw. The wire saw rapidly and cleanly cuts through the bone, and it may be that a simple transverse osteotomy is sufficient. If this is not so, then a small wedge can be removed, the base of the wedge being to the inner side of the foot. This, however, is not often necessary, and when one compares the amount of obliquity which is totally overcome by a transverse osteotomy in a case of genu valgum, it will be appreciated that anything beyond a linear osteotomy is rarely necessary in the treatment of hallux valgus. After the division of the bone the toe is forcibly pulled to the inner side and the tissues well stretched. It is often necessary to divide the innermost tendon of the extensor brevis digitorum, which, it will be remembered, is attached to the bone at the base of the first phalanx. The toe is fixed on a rectangular foot-splint in a condition of forced adduction and is kept in this position for ten days after that; passive movements are commenced, but the foot is put back on the splint for three weeks in all, and when walking is commenced one of these elastic bands must be worn with suitable boots. Eventually the result of this operation is good, but it necessarily takes a certain amount of time and a proper supervision to obtain such a result.

WE have received from Messrs. ALLEN and HANBURY a specimen tin of their peptonised milk-food cocoa. An examination of this preparation confirms the claims put forward in regard to its suitability for use in the nutrition of delicate patients, in the nursing of the sick, and in the feeding of children and old people. An interesting and valuable quality in this scientific food-beverage is its easy digestibility, which important result is secured by means of a process in the course of its manufacture that efficiently peptonises this excellent product. For general consumption this brand of cocoa will be found convenient and advantageous because of the ease with which a wholesome and light food can be prepared by the addition of water.

CLINICAL REMARKS ON CERTAIN CASES OF CATARACT EXTRACTION.

By CHARLES BELL TAYLOR, M.D.,

Surgeon to the Nottingham and Midland Eye Infirmary.

I HAVE on a previous occasion pointed out the desirability of adopting a simple operation in ordinary cases of cataract. Some cases, however, are by no means ordinary and require special treatment. Here are a few examples of what I mean:

Carl H., a Russian subject, hailing from Liverpool, æt. twenty-eight years, was, when I first saw him, blind from cataract on the left eye, the result of a punctured wound received when a conscript five years ago. We found on examination that the capsule was white and glistening, the iris tremulous, the lens displaced and sight reduced to bare perception of light. General anæsthetics were contra-indicated, and any slow process of treatment by absorption, owing to the patient's position, could not have been carried out. So I thought that if, under cocaine and holocaine, I could make a small incision in the upper border of the cornea and draw out the capsule with forceps, the lens, presumably soft or squeezable, would follow without difficulty. But I was mistaken. The capsule, it is true, was easily removed entire; but the lens proved to be unusually large and very dense, so that it could not possibly be extracted through a small incision, and I therefore decided to enlarge the wound with scissors. But just as I completed this part of the operation the patient, who had the defects of his qualities, gave his eye a tremendous squeeze, whereupon out gushed a considerable portion of the vitreous humour and the lens sank out of sight, while spasm of the orbicularis, which could not be controlled, caused reflection of the flap. I therefore rapidly fished out the lens with my wire scoop, replaced the flap, and closed the eye with an antiseptic pad. The after-treatment was difficult and complicated owing to his having recently slept in a common lodging house with the not infrequent parasitical result. All the same, *grâce à Dieu*, he made an excellent recovery and now, as you see, has a very good looking eye and useful sight. He was a stalwart, manly fellow, and I should have been grieved if he had lost his eye.

A. H. This lady, sixty-five years of age and quite blind from cataract in both eyes, was sent to me from a distance because the surgeon to whom she had been recommended had refused to operate. It appeared she was subject to epileptic fits attended by violent convulsions, would not allow her eyes to be touched, was very frail, and a bad subject for anæsthetics. Nevertheless as it was necessary, *adviennne que pourra*, to make some effort to restore her sight, I decided to give ether and feel my way with a preliminary iridectomy on the left eye. This was accomplished without misadventure, and I subsequently extracted the cataract from that eye with no further drawback than a rather large prolapse of the iris, which, notwithstanding the iridectomy, was caused by the patient's persistent compression of the lids. I subsequently extracted the cataract from the right eye in the same fashion—*i.e.* with a preliminary iridectomy under ether—and at the same time excised a small piece from the lower segment of the iris of the left eye with the aid of a blunt hook so as to restore a central pupil. She has now excellent sight with both eyes, and the prolapse is not noticed unless looked for.

C. R. This lady, though only a little over thirty years of age, appeared at first sight to be suffering from simple senile cataract of the left eye. She was anxious, probably for cosmetic reasons, to be operated on at once, so I accordingly proceeded to extract. But as she reclined on the operating-table I noticed that the iris was tremulous, and that a simple extraction such as I was contemplating would probably be attended with collapse of the eyeball. I therefore made a small linear incision at the upper border of the cornea and extracted the lens with a wire vectis without iridectomy and without opening the capsule. She has now good sight and a very handsome eye.

Cases of this kind crop up from time to time in the course of a large practice, and it behoves us to be ready to meet such difficulties when they arise.

I will conclude by citing a few cases which are specially interesting from their apparently hopeless character.

J. B., æt 33, from Leeds. This patient had been blind for upwards of twenty-five years. When five years of age the right eye was perforated by a penknife, which slipped as he was cutting a piece of leather. Violent inflammation followed, and

when I first saw him the injured eye was reduced to a mere stump. Two years later intense sympathetic ophthalmia was lighted up in the other eye, the result of which was that the iris and capsule became firmly adherent to the lens and the lens itself was converted into a dense white mass—cataracta accreta complicata. The patient had not very good perception of light, and had been in this condition upwards of twenty-five years. I determined, hoping against hope, to make some attempt to improve his condition, and with that end in view devised a pair of iris forceps with sharp hooks, made a large flap incision in the corneo sclerotic junction downwards under cocaine and then grasped what was once the iris, insuring close contact by elevating the handle of the forceps with the disengaged hand, and in this way succeeded in tearing away a considerable portion of degenerated tissue, revealing a massive porcelain-like lens which could not be extracted although I had made a flap of fully one half of the cornea. I therefore slipped a wire spoon behind the mass, and then by alternating pressure upon the cornea and lens succeeded in delivering it. He recovered without a bad symptom and with a beautiful eye, and, incredible as it may seem, really useful sight. He can thread his way among the furniture in a badly lighted strange room, tell a man from a woman across the street, and with a lens make out words of Jaeger's No. 14 double pica. He says he is a king to what he was.

L. H., from Lancaster, æt. 22 years. This lady had been quite blind upwards of three years from cataracta accreta complicata in both eyes. She had been treated at an eye infirmary but was discharged "incurable." "Is it any use my going elsewhere for treatment?" she asked. "None whatever. You must get into a blind asylum without delay; no one can do you any good."

The extraordinary feature in this case was the extreme softness of the eyeballs, a condition which has hitherto been considered to preclude all hope of restoration to sight. Nevertheless I removed the lens from each eye with my sharp forceps and, incredible as it may seem, succeeded in restoring excellent sight for reading and writing and all other purposes.

P. R., from Worcester, æt. 24 years. This patient had been blind all his life from congenital cataract. He had been operated on by distin-

guished surgeons, with total loss of the right eye and closed pupil on the left. I was told that he was considered incurable, and that he was in consequence sent to a blind asylum, where he remained for several years. I determined to extract on the left eye and by making a large pupil succeeded in removing the obstructing mass of lens and inflammatory deposit, thus restoring most excellent sight; indeed, he can see the smallest objects, though he has never learnt to read, and traverses the streets of the faithful city with the utmost facility.

J. F., æt. 36, from Cheltenham. This gentleman when I first saw him was suffering from myopia, glaucoma and cloudiness of the cornea of the left eye. In 1897 he was iridectomised by an accomplished surgeon without benefit and when brought to me, on September 28th, 1903, was in a sad state, even perception of light being very doubtful with the left eye and the right hopelessly lost. I did a large iridectomy downwards and subsequently extracted the lens of the left eye and a few weeks later removed a mass of capsule. He can now see the face of the person he is addressing (imperfectly), recognises articles of furniture, and gets about by himself with difficulty. I always counsel hope in such cases. Hope is happiness in itself; and however frequently our aspirations may be frustrated, we sometimes succeed, and that is reward enough. A man with imperfect sight in only one eye is a king among blind folk, and he who can distinguish a chair from a table and get about in his own way is much better off than one who previous to our interference had only bare perception of light. "He who walks without hope walks backwards," and we should always remember that—

"Our doubts are traitors

And make us lose the good we oft

Might win

By fearing to attempt."

—*Measure for Measure*, Act 1, Scene 4.

WE have received from BURROUGHS and WELLCOME a specimen bottle of "Tabloid" iron and strychnine phosphates. In this combination iron and strychnine are presented in the same dosage as in 1 fl. drachm of the official syrup of phosphate of iron with quinine and strychnine. It is useful in the case of those who cannot tolerate quinine.

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* Specially reported for the Clinical Journal. Revised by the Author.

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A CLINICAL LECTURE

ON

RODENT ULCER AND ITS TREATMENT.*

By A. MARMADUKE SHEILD, M.B., F.R.C.S.
Surgeon to the Hospital.

GENTLEMEN,—The case I wish to discuss with you to-day is a very instructive one. The subject is a strong, active, hale, spare man of nearly sixty years of age, a "wiry" Scotch keeper, who has been much exposed to the weather, and has led a hard and laborious life. As is usual with such individuals, his general bodily health is perfect, and he would probably be able to sustain privations or fatigue which would subdue many a younger man the product of city life. For no less than thirty years he has been troubled by what he long considered a very trifling ailment. Just in front of the left ear a small pimple or wart formed. It was irritable, it itched and burned, and was sometimes scratched. Then a little sore formed, not larger than a "split grain of barley." This would "scab over" in the summer, but sometimes in the winter would become again "raw." About twenty-five years since the patient went to Glasgow, and the sore was cut out by the late Sir George Macleod. For some years it remained well; then in a cold winter it returned, sore and troublesome again. Nine years ago this man placed himself under the care of Sir Mitchell Banks, who performed a "scraping" operation, and for at least three years the "place" remained cicatrised. Then it again became sore. Last year it was "scraped" by a local medical man, and very efficiently, for it has since remained healed, the site of the ulcer being marked by a cicatrix of irregular shape about an inch in its longest measurement immediately in front of the auricle. During the last twelve months a very remarkable

* Delivered at St. George's Hospital Medical School.

phenomenon has occurred: a swelling formed in the retro-auricular furrow, superiorly, above the concha. This was opened, and declared to be a cyst, but it never healed. Now there is a deeply excavated ulcer with ominous hard gristly edges in the furrow behind and above the ear, deep, and fixed to the cartilage of the canal. The glands of the neck seem unaffected. The discharge from the ulcer is scanty and not offensive. The granulations are poor and ill-formed, and the sore is absolutely painless.

This case affords a good example of the disease, so important, found in healthy and elderly persons, known as rodent ulcer. There is a great deal to be said about it, but its main clinical features may be summed up in a very few words. It attacks elderly persons. It is exceedingly chronic, its progress being often measured by years. It is painless, and does not infect the glands. It is apt to inveterately return after treatment, and in some cases has been bad enough ultimately to terribly destroy the tissues. Bones and cartilages alike melt away in a slow, progressive, and destructive ulceration. The eyeball may be destroyed, and the features be lost in a huge and unsightly chasm. Such sad cases are still occasionally met with, and illustrations of the terrible ravages of this disease are found in every hospital museum. Extraordinary to relate, the vast majority of rodent ulcers are found on the face or head, and above a line drawn through the upper lip. The inner canthus of the eye or the temporal region are frequent sites. The disease is so rare on other parts of the body that you may almost disregard it. I have seen rodents on the foot, hand and part of the thorax, also on the genitals and pubes. Such cases are very exceptional, and to be reckoned as curiosities. There are few such diseases which did not receive lucid description at the hands of that remarkable man Sir Benjamin Brodie, so long a surgeon and teacher in this hospital, and his account of this, as of many other maladies, is well worthy of your attention and repetition. Sir Benjamin remarks, in reference to it, in his 'Lectures on Pathology and Surgery,' p. 333: "A man has a small tubercle upon the face, covered by a smooth skin; he may call it a wart, but it is quite a different thing. On cutting into it, you may find it consists of a brown solid substance, not very highly organised. A tumour of this kind may remain on the face unaltered for years, and then, when the patient gets old, it may

begin to ulcerate. The ulcer spreads slowly but constantly, and if it be left alone it may destroy the whole of the cheek, the bones of the face, and ultimately the patient's life; but it may take some years to run this course. So far, these tumours in the face and these ulcers are to be considered malignant. Nevertheless, they are not like fungus hæmatodes or cancer, and for this reason, that the disease is entirely local. It does not affect the lymphatic glands, nor do similar tumours appear on other parts of the body."

Rare cases of this disease have been described as occurring on the back of the hand, and these have been attributed to infection from the original sore, but with little probability. In the very chronic cases like the one before us, the ulcer may frequently heal over, but by a poor thin pellicle, which generally again breaks down. Such ulcers have hardly any hardness or infiltration at their edges. In other cases the ulcer has a circular form, the edges being hard, waxy, and translucent; but the discharge is thin and scanty, not free, and the glands remain unaffected. Such ulcers are not to be differentiated except in their local characters from epithelioma, but they are peculiarly favourable for treatment.

Pathologists have long been at variance as to the origin and true nature of this remarkable disease. Regarding its causation, whether due to a parasite or not, we know nothing. I regard it as quite distinct from that affection known as psorospermiosis (Paget's disease) seen and described at the base of the nipple, on the pubes, or on the glans penis. Here the resulting ulcer is usually markedly epitheliomatous, the nearest glands are soon infected, and life is destroyed.* Indeed, all clinical research, all microscopical investigations, go to show that this disease is essentially cancerous, but cancerous only in a feeble and local degree—the most chronic, the least expressive, of all forms of cancer of the skin. As to the microscopical characters, they are very similar to those of epithelioma. The "cell nests," so familiar in the latter disease, are not so well formed or pronounced in rodent ulcer. On the edges of the very chronic specimens little is seen but an infiltration zone of exceedingly minute cells. In the hard edges of the circular

* Author, 'Diseases of Breast,' p. 154.

or crater-like rodent ulcers a more evident cancerous change is found.* The proliferating cells assume the tubular type, extending in club- or tube-shaped masses into the tissues around. And this peculiar formation affords us a useful hint as to the very probable explanation of the early formation of this disease—namely, as a very chronic carcinoma of the sweat or sebaceous glands. This was the view taken by Thin after laborious research. His opinions and sections are worth studying, but his paper in vol. xxx of the 'Pathological Society's Transactions' is too long to quote here. The usual morbid proliferation of cells occurs, but of the exciting cause of such proliferation we are still ignorant. The club-shaped masses of cells extend laterally into the tissues around, far more than deeply into the tissues beneath, as in the epithelioma, and they are not so well formed and luxuriant in growth. Tilbury Fox long ago maintained that the disease originated in the outer sheath of a hair-follicle, and this view was supported by Fergusson.† The majority of Continental observers make no distinction between this disease and epithelioma, and for clinical purposes this is a very good and useful view to take.‡ The location of this peculiar ulcer to the upper part of the face is very remarkable. We may well ask ourselves why this change should not occur in the sebaceous or sweat glands in the axilla, groin, or on the limbs. Mr. L. Cheate has ingeniously argued that these ulcers occur in the course of areas of distribution of the fifth nerve, in some of its divisions, and that in excision of the ulcer we should try and plan the incisions so as to remove the nerve area affected.

The diagnosis of rodent ulcer is not difficult. A superficial ulceration of the face in an elderly person will be either syphilis, or rodent, or true epithelioma. You must ever be on the watch for syphilis in face ulcerations. The serpiginous outline and dusky edges are always suspicious, but the comparative rapidity of the spread of the ulcer should at once arouse your suspicions. A syphilitic ulcer will extend in months, a rodent in years. These curious relics of an ancient syphilitic in-

fection will "crop up" in elderly persons, often in good social positions, and in whom anything of the nature of history of a primary infection is quite unobtainable. A judicious course of iodides with mild mercurial local applications will often work wonders in such ulcers. As for epithelioma, the pain, the solid deposit, and the involvement of the glands in the neck will guide you. The diagnosis of lupus is made by the appearance. This may seem a truism, but if you carry out what I perpetually inculcate, and look at diseased conditions as well as read about them, you will usually have no difficulty in diagnosing lupus when you see it at a glance. Lupus of a destructive form rarely, if ever, originates on the face of a person of over forty years of age, though the results of its early ravages may be then apparent. The peculiar nodules of lupus are usually well seen in ulcerative cases and are very characteristic. Ulcerative lupus nearly always attacks the parts about the alæ of the nose, and is practically a disease of the young. Although the diagnosis is generally easy enough, there are such curious conditions as mixed ulcers of the face. I do not know what better name to coin for them. But when a rodent occurs on the face of a patient who has an old syphilitic taint, its characteristics are modified. And so when syphilis and tubercle are combined, the results are curious and unusual. I mention this to indicate to you the various reflections that should pass through your minds in diagnosing these very curious and interesting cases.

I have thus tried to explain to you the ordinary characteristics of rodent ulcer, and now I must tell you some exceptional facts. During many years I had the advantage of attending the meetings of the Dermatological Society of London, and while there I saw several cases in quite young persons. In one of these there was a distinct family history. Thus, though rodent ulcer is a malady of advanced life, it may occur in quite young people, and then is peculiarly liable to be misunderstood.

Some of the more chronic rodents may scarcely ulcerate at all, and if they do they rapidly heal over again, but the pellicle is never sound and firm, and often gives way and breaks down again, especially in the extremes of heat and cold.

In other cases the return and ravages of this curious disease are very inveterate, and terrible destruction of tissues is the result. Yet large vessels

* For a typical case of this nature see Anderson, 'Brit. Journ. Dermatology,' 1889, vol. i, p. 379.

† Fergusson, 'St. Bart.'s Hosp. Reports,' 1885, xxi, p. 101.

‡ Barling, 'Birmingham Med. Review,' 1885, vol. xviii, p. 65.

and nerves commonly escape. I have several times seen the branches of the facial nerve laid bare by the ulcerative process, and no paralysis ever occur. There are exceptions to every rule, and cases where it has been actually found necessary to tie the large vessels of the neck are on record.

The common carotid artery was tied by Michel* for an "alarming hæmorrhage" from a rodent ulcer of huge size. The growth was dissected out and the "cure" which resulted was stated by the surgeon to be due to the cutting off of the blood supply. A critical inquiry of the symptoms led me to believe that this ulcer, which reached all over the side of the face and neck, was really a form of ulcerating gummatous syphilide. The patient had a similar sore on the finger, which healed under iodides.

I now pass on to the important matter of the treatment of this disease. There can be no question that what I am now going to say, if appreciated and acted upon by all medical men, would save many patients from great misery and suffering, and their doctors from blame and disrepute. I may summarise: Any wart, mole, or pigment-spot on the face of a person over forty years of age which increases in size, which itches, "burns," and especially becomes "sore," or "scabbed," should at once be excised. The practice of applying inefficient caustics to such formations is very injurious. Rubbing with nitrate of silver, "touching" with nitric acid and the like are seldom enough to eradicate the area of cell proliferation, on which the danger of these cases depends. Such imperfect treatment only aggravates the disease. Never do it, however much patients may desire you so to act. The excision of these little formations is often well managed by a diamond-shaped incision around it. The whole area of affected skin must be removed, and its whole thickness also. The margins of the incision must be well free of the suspicious spot. An area of apparently healthy skin must be sacrificed without compunction. The fear of making a scar, of tedious healing, makes a number of these operations incomplete and unsatisfactory. I have seldom seen them performed with sufficient freedom.

The bleeding is always free and troublesome ;

* 'Boston Med. and Surgical Journal,' vol. ciii, p. 285, vol. cii, p. 610.

sponge pressure usually controls it after a time; any prominent vessel must be twisted. A great secret of getting immediate union in these cases is to thoroughly detach the surrounding skin from subjacent parts by introducing a tenotome around the margins of the incision. It is surprising how parts come together which may otherwise seem to gape hopelessly. Fine horse-hair is the best suture, and I leave the stitches untouched for at least six days. A collodion dressing is always employed.

In more extensive ulcers the incisions must be correspondingly free, and it is often quite impossible to attempt union of the edges. Even here the sliding of the skin by free subcutaneous incisions and the implantation of skin flaps can do a great deal. The "twisting in," or implantation of a skin flap is of peculiar value. Even if the whole raw surface beneath is not covered, it much expedites subsequent healing, and the surgeon will find ample opportunity for ingenuity in fashioning such operations, which differ so widely, that the incisions must be carefully thought out and planned for every individual case. In cases where implantation of skin flaps is impossible the method of Thiersch grafting must be employed.

Contrary to expressed opinion, I must strongly urge that these operations should be done under general anæsthesia. The injection of cocaine into the face is dangerous. The injection of eucaine, though satisfactory enough in courageous patients, does not suffice for the nervous, who will form a considerable proportion of your cases. Movements and exclamations ensue. You are led to hurry over the operation and the accurate union of the wound, so important and often a difficult matter, is badly executed. I know of no cases in which time is of more absolute importance than in excision of one of these growths from the regions of the eye-lids. If hurriedly done and the incision sewn together "anyhow," serious deformity of the lids is apt to arise afterwards, and this may be very hideous and disfiguring to the individual.

Again, the common practice of doing these, so-called, minor operations in your room and sending the patients home is not a very good one. Such an operation is just the one to originate facial erysipelas in an elderly lady, and this is not a pleasant complication of an operation which should be trivial in its associations. Personally, I insist on such patients remaining indoors, and I

always take elaborate care in the disinfection of the skin of the face, and in the preparation of the instruments, just as if I were going to perform a great operation.

The ulcer, if at all "foul" or extensive, should be lightly painted over as to its base with pure liquefied carbolic acid. The appropriate incisions must vary with the position of the growth and leave ample room for ingenuity in each individual case. There is one point which stands out very clearly above all others. It is as follows: A very ample margin of sound skin must be sacrificed, and any partial or incomplete operations are useless. The eyelids are very prone to serious deformity after operations. Rodents are often found near the eye, and the diagrams may help you to know how incisions are to be placed in these really very difficult cases. The principle of always transplanting a flap of healthy skin into the site of the excised ulcer is, I am sure, a good one, and should always be adopted when possible.

In more extensive ulcers a combination of excisions with scraping or caustics is needful, and the process has often to be repeated, for such cases are seldom cured. The more extensive the destruction of tissues and exfoliation of bone by caustic, the better will be the ultimate result. Chloride of zinc paste and potassa fusa are the caustics I advise. The latter is peculiarly valuable, both in lupus and rodent ulcer, but needs careful management.

An excellent account of the treatment of extensive rodent ulcer by a combination of cutting out and the cautery and chloride of zinc paste is given by Jacobson.*

It now becomes needful for me to tell you what I know about the "light treatment" for rodent ulcers, and it is difficult to approach this subject with an unbiassed mind, because the X rays and the Finsen light are now being used in a most reckless and reprehensible fashion in London by all sorts of persons, many of them not medical men at all, who are reaping a temporary harvest from the credulity of the public in all matters electrical! Malignant disease of the rectum and diabetes are somewhat diverse diseases, but I know of an electrical institution which lays claim to the cure of these maladies, and it is not without its supporters! Anything mystical, as electricity or the

X rays, naturally appeals with great force to the ignorant. And so little has human nature changed in hundreds of years that a professor of palmistry or a "clairvoyant" in Bond Street is as much sought after by the fashionable world of London in the present day as was the witch of Endor in more remote ages! I believe I am still considered young in the surgical profession, but I have lived long enough to see many vaunted remedies for disease deservedly consigned to the limbo of obscurity. I advise you very strongly, when such novel methods arise, to examine the results of treatment very critically and for yourselves, before recommending them to patients, and always seek out men of reputation and position to employ them.

The questions we have to ask ourselves are as follows: Is the treatment by X rays or the Finsen light superior in its immediate and ultimate results to operation? What special cases are most suitable for its employment? What sort of "light" is best? What is the efficacy of radium?

The most contradictory accounts are before me. For instance, this summer I saw two patients who declared they were made much worse by the use of the X rays, applied in both cases by quite competent and reputable men. On the other hand, we read of cases rapidly healing. Such instances are now commonly reported.

Space and time will not permit me to enter fully here into the question of the light treatment for rodent ulcer. I merely wish to tell you what I believe is "safe and true" for your guidance in practice. I may refer you to an excellent paper on "The Uses of Electricity and Light in Surgery" by Dr. Sephton Cooper in the 'Guy's Hospital Gazette' for September 24th, 1904.

The "radium treatment" is still in its infancy, and from the minute quantities of this remarkable substance which can be used, only small, very small, growths can be influenced.

Two cases of rodent ulcer where healing followed the application of radium bromide are related by A. S. Green, of Lincoln.* In both these cases the X rays were tried—in the one for eight weeks, in the other for one month, but without avail. A tube containing radium bromide was employed being held against the ulcer for fifteen or twenty minutes—seven exposures in a month. The rapidity

* 'Annals of Surgery,' 1888, p. 101.

* 'Lancet,' March 19th, 1904.

of healing is stated to be remarkable. An interesting case of this treatment is also related by Mr. G. Sichel, of Guy's Hospital, in a patient of Sir Cooper Perry's. The ulcer had seemed to have taken a long time to heal up ('British Medical Journal,' January 23rd, 1904); it was on the cheek, in an awkward position for a cutting operation.

After reading all the opinions of the experts and considering my own experience, I have come to certain conclusions, which I think you may take as a guide.

1. The X rays seem superior to other forms of light treatment for rodent ulcer.

2. Ulcers with much solid deposit at the margins are intractable to this form of treatment.

3. Small and very superficial ulcers are the best for this treatment.

4. As regards the permanency of cure, which after all is the consideration in these cases, I am not in possession of trustworthy records to show me that the results are any better than those by excision, scraping, or powerful escharotics.

5. The "light treatment" is always tedious, and consequently expensive. Many "exposures" have to be undergone, and the prognosis of results is uncertain.

6. The disastrous X-ray dermatitis has always to be most carefully guarded against. If it occurs it may be worse than the disease.

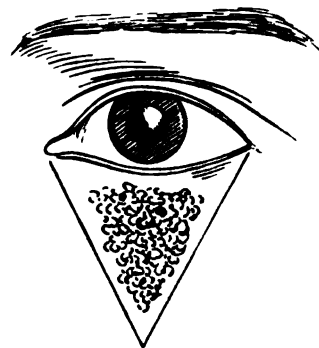
7. As regards radium, further observations are needed before we can speak positively about it.

Accordingly when a case of rodent ulcer comes before me, I advise an immediate and well-planned excision, with transplantation of skin if possible, and the only cases I advise the X-ray treatment for are those where excision is impossible or the patients refuse it. A rodent implicating the facial nerve or Stenson's duct, for instance, may well be treated by the X rays. The diagrams illustrate how rodent ulcers near the orbit may be managed by excision without causing subsequent serious deformity. So variable is the position of these ulcers and so different their size, that plastic operations must be invented for every case. The three leading principles to keep in mind are as follows: Operate as early as possible, even on suspicion of a wart or mole taking an ulcerative action. Cut far and wide of the diseased tissues. Plant in a flap of healthy skin if possible.

The following illustrations will give you some idea of the plastic operations which may be done near the orbits in these cases.*

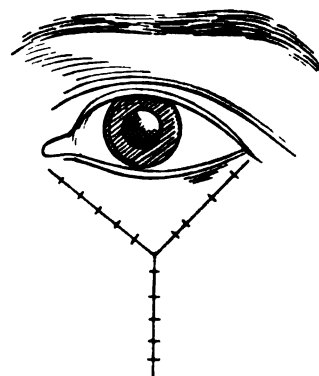
You must be very cautious in prognosis as to return in these cases. I fear as a rule that rodents return locally very generally; but the earlier and wider the operation the longer period of freedom

can be promised. So far as I have seen, those curious ulcers with a deep ulcerated circular centre and a thick margin are peculiarly favourable for operation and many years of freedom from return. Indeed, I believe they may never return, and be definitely cured by operation. The curious phenomenon of healing a rodent ulcer after an



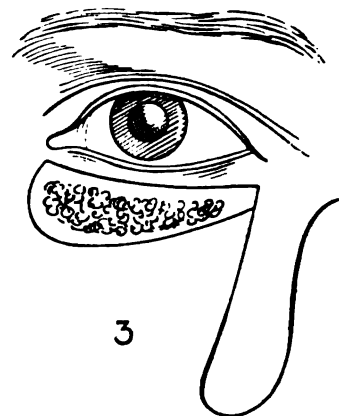
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FIG. 1.—Rodent ulcer beneath eye, excised by a V-shaped incision.



2

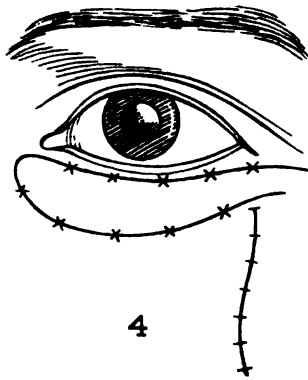
FIG. 2.—The V converted into a Y.



3

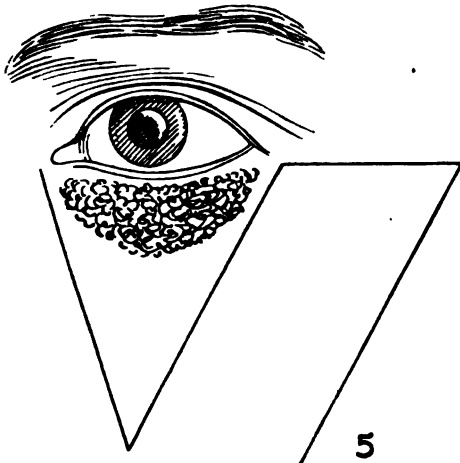
FIG. 3.—Elongated rodent ulcer under eye.

* I am much indebted to the work on 'Surgical Technique' by von Esmarch and Kowalzig for hints on plastic operations on the face.



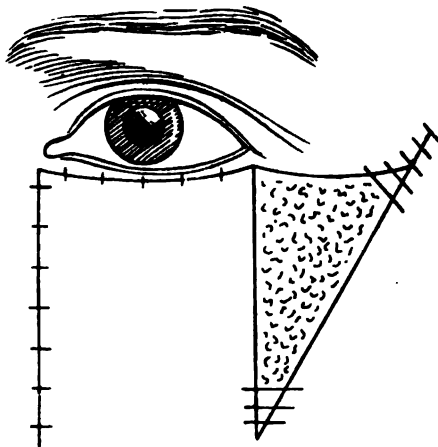
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FIG. 4.—Implanted flap, to prevent eversion of eyelid.



5

FIG. 5.—Extensive rodent under eye, with skin flap marked out.



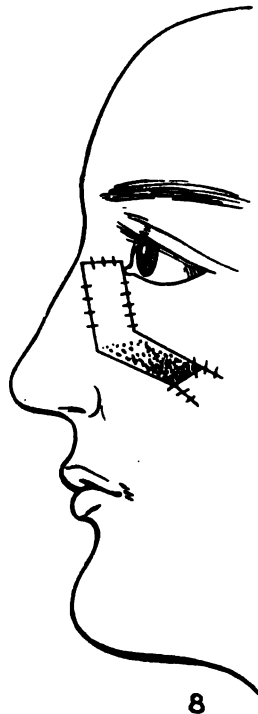
6

FIG. 6.—Flap in position after excision.



7

FIG. 7.—Excision of small rodent from inner canthus of eye.



8

FIG. 8.—Parts seen in position after excision of rodent from inner canthus of eye.

accidental attack of erysipelas I have more than once witnessed. In no case was the improvement at all permanent.

THREE LECTURES ON SOME INJURIES AND DISEASES OF JOINTS.*

By F. C. WALLIS, F.R.C.S.,

Surgeon to Charing Cross, St. Mark's, and Grosvenor Hospitals.

LECTURE II.

GENTLEMEN,—I will begin this afternoon by considering in some detail the subject of synovitis. The ordinary traumatic synovitis is common and the treatment well known. The main thing to be avoided is keeping the limb too long in a fixed position. This usually causes considerable stiffness, which takes some time to get rid of. Hot applications are better than ice-bags for a recently injured joint. Massage should be properly applied to the joint by the third or fourth day, and ordinarily at the end of a week the limb can be used in moderation. As a rule simple traumatic synovitis follows an uneventful course and resolution occurs within ten days or a fortnight, but a certain proportion of cases do not follow this rule. Whether it is due to the fact that the general health of the patient is indifferent or that for some cause not obvious the patient has a large amount of micro-organisms in his blood and tissues generally it is difficult to say; but whatever the cause the result is a grave one, and must be treated with the utmost care and expedition. As an example of this I may quote the following case, which I have already published in a paper on this subject.

A railway porter in getting into a train struck his knee against the door. On arriving at his destination two hours later his joint was painful and hot. He was admitted to the hospital suffering from a much distended knee-joint and a high temperature. The knee-joint was aspirated, but there was no relief to the patient. Two days later the joint was opened and washed out, but the temperature was still raised and the pain considerable. The joint was reopened and drained and on examining the joint surfaces it was found that the cartilage of the patella was already eroded. Various counter-openings and drainage-tubes were made and inserted and frequent irrigation was

carried out, but the man became much worse, the tissues in the neighbourhood of the joint became involved, and it was necessary to amputate the limb through the thigh to save his life. It will thus be seen that although the large proportion of cases of traumatic synovitis get quite well, yet at any time such a case as this may occur. It is not an easy matter to set down any hard and fast rules in such cases; but when after suitable treatment the pain of the joint continues and the general condition of the patient with regard to the temperature, and a peculiar restless condition which accompanies these conditions are marked, it is obvious that the symptoms are out of all proportion to the cause of the injury, and that the case is no longer one of simple traumatic synovitis, but rather of septic or infective arthritis. The only possible chance of saving a limb under these conditions is that it shall be incised, irrigated, and efficiently drained within the first forty-eight hours following the injury. At the same time the fluid in the joint should be investigated by the bacteriologist.

The peculiar state which gives rise to such a serious result of what is otherwise a comparatively harmless traumatism is a matter of profound interest, and one which does not affect an acute condition only, but many forms of sub-acute and chronic synovitis may be traced to the effect of some infective condition which has been in existence for some time and gradually has permeated the tissues of the individual affected, so that some slight alteration of physiological balance in the ordinary work of the tissues gives rise to a form of synovitis which until recently has been generally put down to any cause but the right one.

The first occasion on which my attention was called to this condition of things was twelve years ago, when I had under my care a child *æt.* 14 years, with septic ulceration of the rectum, who had at intervals attacks of acute synovitis in one or more joints accompanied with considerable pyrexia. The attacks lasted some days and were regarded as rheumatic attacks and treated as such. When eventually the local condition of ulceration was cured the condition of the joint cleared up and has not returned now for over eight years. Since then I have had various other patients afflicted with the same trouble who have been affected with synovitis which in each instance has disappeared when the condition of ulceration has been cured.

* Delivered at the Medical Graduates' College and Polyclinic.

This was mentioned by me in a paper read at the British Medical Association Meeting at Ipswich some few years ago. Dr. O'Connor, of Buenos Ayres, has made two important communications with regard to this condition of septic synovitis of joints which would, ordinarily speaking, be regarded as rheumatic, but which he treated by incision and drainage with the very best result in every case. Dr. Rolleston published a paper concerning a similar condition in the CLINICAL JOURNAL on March 1st, 1899. Following this, I read a paper and published a series of cases in the 'British Medical Journal' on the same subject. Since then a fair amount of attention has been paid to this most important condition; but it is essential, in order that the full benefit of the treatment required is obtained, that a more thorough and general appreciation of these cases and their treatment shall exist. A considerable number of cases of synovitis occur, particularly in young people, which have been and still are treated in a perfunctory manner by anti-rheumatic remedies with little or no avail. These cases are all due to some micro-organism, the gonococcus, pneumococcus, Streptococcus articularum, Staphylococcus pyogenes aureus, or some other micro-organism. These cases, if treated on an expectant plan, take a long time in getting well, and are usually associated with marked wasting of muscles and considerable stiffness, possibly ankylosis, of the affected joints. The acuteness of the symptoms varies within considerable limits. In some the distension of the joint is considerable, pain is acute on movement or handling, and the temperature runs high and goes on for weeks. The following is an instance of this class of case: A young girl, æt 18 years, was in the hospital as a case of rheumatic fever, with a temperature ranging from 100° to 102° with a painful and distended knee-joint. After three weeks' treatment for rheumatic fever she remained in the same condition as on admission. I was asked to see the patient, and decided to open the joint. This was done and the joint washed out with saline solution. The temperature became normal on the following day and remained so. The patient recovered with a normally movable knee-joint. Other cases are not so acute, but are persistent. The joint is somewhat tender, usually markedly distended, and the temperature, although not high, is always above normal. The following

is a typical instance of this class of case: A young woman æt 24 years came to the hospital with a painful right shoulder-joint, which was distended with fluid. The onset was causeless, as far as the patient knew. It was treated expectantly in the out-patient room for a few days, until a bed was vacant. In this case the temperature was never over 100° and never quite normal. On admission, the joint was opened and washed out with saline solution. It contained fluid which was turbid, with flakes of lymph in it, and pus-cells were seen under the microscope. The bacteriological examination of the fluid revealed the presence of gonococci. The patient made an uninterrupted recovery, with perfectly normal joint movements. Many cases of this sort could be given as examples, but for the time being these will suffice. The practical point is the recognition of these cases, and also of the fact that incision and getting rid of the fluid and washing the joint out is the only effective method of dealing with it, and that any temporising in treatment of a prolonged character ends in a damaged joint. All these cases of so-called idiopathic synovitis are due to some infection or another, and when the micro-organisms have once settled in the joint there is a constant struggle going on for supremacy of the joint-fluid or the micro-organism. As I have said elsewhere, the synovial lining of the joints resembles very much the synovial lining of the abdomen. It is most capable of resistance, and if allowed the opportunity of showing its power, it will always take the best advantage of it; and it is given this opportunity when the joint is opened, the contained infected fluid removed, and the joint thoroughly washed out with some non-irritating fluid such as saline or sterilised water. Strong chemicals, or indeed chemical solutions of any sort, should not be used in washing out these joints, as their effect, although detrimental to any micro-organisms present, is equally, probably more, injurious to the delicate synovial membrane. The recuperative power of the synovial membrane is quite extraordinary in these cases provided that it is not too far injured. This is well shown in the first case I mentioned, in which for some weeks the joint had been distended with infected synovial fluid, yet when this was once disposed of complete recovery took place. It is rarely necessary to drain these cases, and the second case quoted is a good example

of the truth of this statement. This is a matter of some importance, as it shuts out one not unimportant risk which may occur if a drain is left in. To those who are not accustomed to seeing joints treated in this way it may seem a somewhat severe measure to take. But I think this is only because it is not so common as other conditions with which we are more familiar. Who amongst us will, for instance, hesitate for a moment to *urge* a patient with relapsing appendicitis to have the appendix removed? And yet the risks to life of this operation must be far greater than incising a joint. It must be obvious that the same principles which have rendered the opening of the abdomen such a safe procedure will render equally safe the opening of a joint; and if this fact is once grasped, and as a matter of principle these joints are opened and washed out, a great deal of good will be done, and instead of the patient being kept in a somewhat critical condition for weeks and suffering pain unnecessarily, probably ending up with a much impaired joint, a rapid and perfect recovery will in the vast majority of cases occur. The incision need do no harm to the movements of the joint.

Loose semilunar cartilage.—This troublesome and painful defect of the knee-joint is not uncommon, and most of us have probably seen various cases of it. The cartilage, dependent on the amount of mobility, gives corresponding trouble to the patient. The typical sudden locking of the joint, with inability to straighten the limb, followed by synovitis, is a marked degree of the trouble under discussion; but there are many people suffering from loose semilunar cartilage which does not cause such incapacitation as in this typical case, and yet the symptoms are sufficiently bad to cause constant trouble and temporary lameness to the patient, and if persisted in chronic synovitis occurs and the joint becomes weak. Slight cases of this complaint are best treated by means of an instrument such as is shown here, the object of which is to keep the cartilage from slipping and to prevent undue or indeed any lateral movement of the joint. These instruments can be worn comfortably when walking, riding, or even dancing, and if worn for a sufficiently long time, a year or eighteen months, there is quite a fair chance of the slight cases being permanently cured. When the cartilage is obviously displaced and causes marked lameness, with pain and synovitis, the best plan is to

remove the offending cartilage before any more permanent damage is done to the joint. An incision is made over the cartilage, which is very soon arrived at, and its detachment from the head of the tibia is the next step. It is not necessary to remove the whole cartilage; in fact, this would be a difficult matter. The middle portion is the part mainly at fault and it is that which requires removal. Afterwards the wound is closed and the leg is placed upon a slightly-bent Macintyre splint and should be slung. The limb is kept in this position until the wound is healed, when it may be removed from the splint. No attempt at walking should be made for three weeks and then only with a stiff knee. It is safer not to attempt to



walk without a back splint. If this is neglected it will be found that the pain may return and the joint will certainly become filled. Even after the cartilage has been removed it is necessary to wear for some months the apparatus I have already shown you. The reason of this is on account of the increased possibility of lateral movement after the removal of the cartilage, and this must obviously be so if we think for one moment of the arrangement of the knee-joint. In the ordinary normal joint when the limb is semi-flexed only the very slightest amount of lateral movement is possible. If from these close-fitting joint surfaces rather more than an eighth of an inch is removed on one side, it must be clear that the amount of lateral movement ordinarily possible is largely increased, and this is the one thing that causes

trouble after the operation. It can be avoided by systematic use of this instrument. The question as to when an operation for this derangement should be done is one which can only be decided by a man's own experience, and also it is a matter on which there is some diversity of opinion. Some surgeons claim that they practically never operate, others that they practically always do so. But the points that must guide us in the question are: the age of the patient, the occupation, and the amount of inconvenience or positive disablement which the condition produces. If these factors are properly considered, it must be a matter of common-sense to any surgeon as to which case to operate on and which case to leave alone. In a large majority of the cases it is clear that attempts should be made to benefit and possibly cure the condition by means of such an instrument as I have shown you. When this has had a fair trial the operation can always be resorted to.

LECTURES

ON

COMMON SKIN DISEASES OF CHILDHOOD.

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ECZEMA.

LADIES AND GENTLEMEN,—My subject is a practical one, and deals with conditions of which we all need a little knowledge, for the common skin diseases of childhood require some care in their management. They bring with success much credit, and with failure a good deal of annoyance. Further, there can be no doubt that you can make some of these skin diseases much worse by rough and improper handling; and yet it is not very easy to obtain, except from experience, a clear idea of what is meant by this rough handling.

I shall, then, in this lecture, which is concerned chiefly with infantile eczema, devote a little attention first to the general management of the infant's skin.

The infant's skin.—The skin of the infant is very delicate, this delicacy of the skin being sometimes

preserved even into adult life, while other cases, with the advance of years, develop what might almost be termed a hide. In early life you can easily detect differences in the resistant nature of various skins, and you will certainly be struck with the frequency of eczema in fair-haired, blue-eyed, rather anæmic babies, upon whose cheeks there is a pretty pink flush. Their skin on close attention you will find is too dry, and you can trace every step from this slight imperfection to that of severe xerodermia.

In the first two years of life there are many changes to which this delicate skin is exposed, and you will not be surprised to hear that eczema is more common then than later in childhood. This is especially true of the children of the poor. Rough soaps, improper clothing, neglect, slight ailments overlooked, undue exposure to cold winds, strange diets—the well-to-do child *may* have to contend with all these, but the child of the really poor has frequently to do so, and is dragged down further still by dirt and parasites. Thus, for example, pediculosis often sets up a very aggravated eczematous condition, due mainly to scratching and inoculation from one site to another by means of finger-nails, etc. In such cases the parasites can nearly always be found in any woollen or flannel garment covering the trunk when no other obvious condition for the eczema is present.

Again, neglected otorrhœa is often the starting-point of a moist, intractable eczema spreading on to the cheeks and face. (I say intractable because this cause is often overlooked, and until discovered the treatment of the facial eczema *alone* proves futile. Weak boracic or carbolic lotion for syringing the ears is the most useful in such cases, speedily curing the condition.)

Baths.—The bathing of infants is one of the most elementary domestic accomplishments. Soft water is much to be preferred, and the temperature carefully graduated as the age increases. The bath at night should range around 100° F., but if the baby is strong at six months of age it can enjoy a bath at 80° F. in the morning. The drying should be very careful and the softest Turkish towelling used. It is not at all uncommon that from neglect of these simple points an intertrigo is started, and in the child with a delicate skin this may become eczematous.

While upon this question, I would point out that

intertrigo and severe eczematous excoriations of the buttocks and thighs may be set up by diarrhoea (decomposing evacuations), especially when the diapers are not often changed, and when, as is often the case, the latter are only dried by the fire being replaced, instead of being thoroughly washed first, as should be invariable.

Soap is an undoubted source of danger, for coarsely scented soaps appeal to the poor mother with her first infant. But some of them are strongly irritant. The toilet soaps, you will remember, are hard soaps made with caustic soda; the soft soaps are made with caustic potash. Excellent toilet soaps are made for infants and those with delicate skins by all good manufacturers. A good curd soap is a very safe preparation, but as the coarse soaps may contain too much free alkali, so may an inferior super-fatted soap be rancid. Most of the yellow soaps in common use among the poor are examples of those containing the excess of free alkali, and are therefore irritating to the infant's skin.

Suitable clothing.—Another point in the management of the skin is that of suitable clothing. We all know the great tendency of the poor to over-clothe their infants, and often enough, of course, they have to use rough material. The perspiration accumulates and decomposes, and thus the skin is irritated and made unhealthy.

The importance of soft diapers and the danger of soiled linen I have already mentioned.

Vests of finely woven wool, diapers of Turkish towelling, a nightdress in the winter of the finest quality flannel, in the summer of gauze flannel or nun's veiling, are garments suitable for an infant's skin.

Exposure to cold winds and hot sun must be avoided. Fierce heat will damage the skin very rapidly. A woollen veil to keep off the wind and a sunshade to keep off the sun are needful for the infant's outfit.

Again, there may be trouble with the head. The skin gets dry, and then dandruff follows, and this, if neglected, becomes the starting-point of seborrhœic eczema. Some of the best white vaseline, or, if necessary, a little olive oil applied on linen, will soon put that right.

The powder that is used for the skin must be very smooth and fine. The poor are often at fault, both in the quality of the powder they

use and the amount of moisture they expect it to absorb. A very good powder is composed as follows: Pulv. Ox. Zinci, Pulv. Ac. Borici, Pulv. Amylis—*ââ partes æquales*; and the affected part should always be cleansed with thin oatmeal water, and then dried, and powder finally *dusted* on. If powders are dusted on before the parts are perfectly dry, they only serve to aggravate the lesions.

So much for the general management of the infant's skin; and these homely remarks are meant to bring into prominence the preventable side of the question of eczema.

Eczema is sometimes fatal; the affection is common in our out-patient department and is often of the worst type, complicated by dirt, misery, and neglect. In spite of this the children, as a rule, do well, and if not, there is often some good reason for the failure. They very seldom die except from some intercurrent disease, though death may occur when, worn out by long illness, and by numerous abscesses from secondary infections, they lose appetite and are carried off by a slight diarrhoea or pulmonary ailment. It is still more unusual for a child to die when an eczema is rapidly fading, but this may occur in the most mysterious way. You know the old tradition that it is dangerous to cure an eczema rapidly at the time of dentition. This tradition has been very roughly handled, and even as I mention it I almost fear to be labelled as a charlatan. We doctors, as a class, are rather destitute of imagination, and what we do not understand usually does not in our opinion exist. Indeed, we sometimes forget that our understanding, in having its limitations, resembles that of other people.

Listen to the words of a learned savant of skin affections, writing of uncured eczema. "Such instances," writes he, "are met with, and under the plea that it would be dangerous to cure such an eruption for fear of 'driving it in.' I had thought that such excuses were no longer made except by unprincipled quacks," etc.

Listen now to the account of a case. In January, 1902, an infant of seven months, who had been suffering from eczema for five months, was admitted to this hospital. The child was well-nourished, even plump, but in distress from the eczema. There was slight diarrhoea. The skin was treated with soothing applications of lead lotion, and later with a mild mercurial ointment.

In eight days the eczema, which, you understand, had lasted for five months, was nearly cured. Suddenly the infant became extremely ill with indefinite symptoms which suggested some possible meningeal or pulmonary infection. In twenty-four hours he was dead, the temperature having risen to 106.8° ! The necropsy showed nothing but a little pulmonary collapse. Now I do not for one moment say that the rapid cure was responsible for the sudden death, but I do hold that the occurrence was remarkable; and remember, the observation is an old one, and I have only recalled this case as an example.

Then, again, there are those cases, not very uncommon, in which eczema in infancy is followed by asthma, and the asthma perhaps again relieved by eczema in later life.

Let us beware of the ignorance of absolute knowledge, and admit that there is much that we do not understand about the causes of eczema, and in that much probably all that is most important; that alternation of morbid processes—asthma and eczema—is specially interesting, and the more so because in both conditions there may be great increase in the eosinophiles present in the blood.

But deaths from eczema are so rare, that today we need dwell on them no longer, but rather look upon the question, not as one of life and death, but as one of the management of a troublesome and sometimes intractable condition.

The CLASSIFICATION I shall adopt is the very simple one of acute and chronic, and later I shall allude to some of the different appearances that eczema presents in different parts of the body.

So far as the MORBID ANATOMY is concerned, I shall only trouble you with the merest rudiments, sufficient to guide us in the question of treatment.

In acute eczema, the minute blood-vessels in the papillary layer of the dermis are found dilated, and from them exudes a fluid of the nature of plasma. The superficial layers of the epidermis die; some of the cells in the rete mucosum die also; others degenerate and add to the sticky nature of the exudation. The normal horny layer of the epidermis is lost.

In the chronic eczema the changes are of the same order, but there is more proliferation and less exudation. Imperfect formation of the epidermis is the result of these processes.

The exudation in the acute forms of eczema coagulates spontaneously, and contains a varying number of leucocytes. When it is excessive the superficial part of the epidermis is washed away, and there is left a moist, raw, red surface. In children the vesicles which are formed by the exudation often become pustules, and many leucocytes are then found in the fluid. This is called impetiginous eczema. Contagious impetigo is a different disease.

Ætiology.—The CAUSES of eczema are numerous, and in my introduction I asked your attention to many external influences. To those influences I add the neglect of an irritating nasal or ear discharge or acid urine, and emphasize a neglected seborrhœa, also all chemical irritants, such as lead and mercury, and parasitic causes, such as scabies. Then there are the mysterious influences of heredity and the effects of alimentary disturbances and dentition. I prefer to leave out the terms gout and uric acid, and to be content with saying that eczema often breaks out in different generations of the same family; and in such families there may be gout, epilepsy, insanity, asthma, and such like nervous affections. Cretinism is a predisposing cause, for it makes the skin exceedingly rough and dry.

The commencement of an attack may be very unobtrusive, starting, as it does so often, from a local cause: in acute cases, however, the spread may be very rapid. Possibly there has been discomfort from pushing teeth, and the child perhaps has been out of sorts some days, but when once the eczema appears, irritation is a prominent symptom. The lesions differ in appearance in different cases, but I shall not describe them as different forms of eczema.

In Eczema rubrum the surface is of a *bright* red colour, and more uniform than in ordinary eczema. The discharge quickly dries, forming very thin transparent scabs, like, "gold-beater's skin," and these scabs when peeled off by the finger leave minute beads of moisture which have been likened to the exudation on a pat of salt butter (this is very characteristic of Eczema rubrum). It may occur anywhere, and is but a variety of the usual *vesicular* eczema. Where there is chafing you generally see at first an *erythema*. This is a common condition in the groins. In *pustular* eczema the vesicles are opaque, and this

form is most common on the heads and faces of poorly nourished children, and may be associated with multiple abscesses. *Seborrhæic* eczema usually spreads from above downwards, and the scales are greasy and yellow; the starting-point is, as a rule, the scalp.

The *papular* forms represent the more chronic types. The occurrence of deep fissures or of chronic hypertrophy of the skin are changes also met with in the chronic types. These occur far more commonly in adult life, but now and then in a child æt. 10 or 12 years you see a chronic eczema in a strictly localised area, as, for example, the flexures of the elbow and knee.

[The lecturer here demonstrated some cases.]

Just a few words upon the **DIAGNOSIS** of the disease. Bear in mind that it is a dermatitis spreading over areas which are not obviously exposed to irritation; that it is exudative, usually symmetrical, and very liable to recur.

To mistake eczema for a *congenital syphilitic eruption* is not uncommon, and is an annoying error to make. The maculo-papular or the pustular syphilides may be mistaken. The guiding rule is to look for other signs of congenital syphilis, such as snuffles, periostitis, condylomata, and such like. As regards the rash look for scars, ulcerations, and cutaneous gummata. Note the induration and the absence of irritation; note also the distribution.

Scabies, when the burrows are ill marked, is easily mistaken. The distribution of the lesions is important; those of scabies are in infancy upon the feet, hands, and buttocks—note the affection of the hands and feet in scabies—while the face, on the other hand, almost invariably escapes. Treatment with balsam of Peru may settle the question, for scabies reacts rapidly to this drug.

Infantile prurigo, or *Lichen urticatus*, is usually distinguished by the scattered isolated lesions, the urticarial wheals, and the numerous papules over the loins. The mistake is made as a rule late in the disease.

Contagious impetigo, again, shows isolated lesions; you often find nits, and the occurrence of pustular lesions over the back of the scalp, with isolated pustular lesions elsewhere, suggests this disease. Several in a family may be affected and treatment cures it rapidly.

Ringworm will show the broken hairs and the fungus.

Should you, on superficial examination, be led to confuse *erysipelas* and eczema, you will at once get out of the difficulty when you recall the constitutional disturbance of *erysipelas* in infants.

Psoriasis differs in the absence of "weeping," in the occurrence of silvery scales which leave a bleeding surface, in the sharp borders of the lesions, and often in the distribution over extensor surfaces. The lesions of psoriasis heal from the centre, of eczema from the periphery.

The **PROGNOSIS** is good, but there is danger of recurrence, especially in those cases in which the actual cause of the eczema is obscure—or perhaps you will prefer the term "constitutional." In very severe cases with secondary abscesses every care is needed. Such infants may come very near death, and nursing, feeding, and treatment must be most skilful. The majority, however, recover.

The **TREATMENT** of infantile eczema is conducted upon broad lines. It must be local, and often also it must be general.

The diet may need a little revision. There may be too much sugar or starch given to the infant, and the older child may get hold of many cakes, jams, and sweets, which must be removed. There is one method of feeding at present in use to which I have an objection. I mean the attempt to make Samsons by the short-cut of compressed nourishment. I need hardly remind you of the numerous concentrated meat essences, and such like, upon the market. Where there is an acute eczema, milk and milky foods are better than these giant-makers, and for my own part they are, I believe, at all times as likely to be giant-killers as makers if pressed upon infants. For older children also the diet must be regulated. If the eczema is acute and the child highly fed, meat is best withdrawn altogether from the diet for a while. On the other hand, if the child is anæmic, weak, poorly fed, then success will follow a good children's diet of plain meats, eggs, milk, milk puddings, fish, etc. These are Samson-builders, but their action is slow.

Management of the bowels is decidedly important, and small doses of sulphate of magnesia may do much good.

Local remedies.—There are many local remedies in use for eczema; but before applying any of them

we must prepare the skin. This is especially necessary with children of the poor, for the scabs and crusts from secondary infections and inspissated humours will form an impermeable barrier to the remedies unless they are removed. To do this, light poultices applied for three or four hours, not longer, may be used when the incrustations are extensive, olive oil soaked into linen when they are few. If you do not feel confident that the poultices can be carefully made and judiciously applied, it is wiser to trust to boracic fomentation or olive oil only. The hair should be cut short.

Next, as to the use of water. In the acute phases it is best avoided, and reliance placed upon thin oatmeal-water or olive oil. To determine when soap and water may be used requires judgment and care, nor need there be any hurry in these cases.

It is out of the question to hope for success in severe cases from any half-hearted treatment. Close observation and persistent treatment are essential. One of the first steps is to control the irritation. It is sometimes extreme, yet I think the children do not suffer the nervous tension from this irritation that a highly-strung adult will suffer. They will tear themselves to pieces, but they often do it joyfully, and do not get so worn and haggard as you might expect. This scratching must be controlled, and I like the use of chloral internally to make the control more easy for them. A child of a year old will take one grain or even two, given at night and repeated in the morning without any ill effect. Putting the child's hands into fingerless cotton gloves is very efficacious, and they can be worn day and night if necessary. They do not in any way hamper the child's natural movements, and keep the nails clean. There are some who advise pinning the child down in a kind of straight jacket, but that hardly seems to me necessary. Cardboard splints applied to the arms are sometimes useful, and careful protection of the head and face are very necessary. We use, you see, a butter-linen mask accurately applied, and protect the head with this linen cap, which behind comes down well on to the shoulders. The mask in front is prolonged downward from the chin in order to prevent dribbling on to the neck. Eczematous patches elsewhere are duly protected, and by suitable harness a child is controlled in the cot, but not pinned down.

External Remedies.—The external remedies we

use are soothing, astringent, or stimulating, and some have but a surface effect, while others have a greater power of penetration.

A good sound rule is to employ lotions for *wet* eczema and ointments for *dry* eczema.

Ointments.—The most powerful drugs for soothing inflammation are the lead compounds, and that is why we use with such success and so frequently the preparation of litharge and olive oil called diachylon ointment. This ointment needs careful preparation, and should be quite soft and smooth like butter. Here is a good example made by our dispenser, Mr. Peck. It is essentially an oleate of lead, and should be scented and preserved by the addition of some aromatic oil.

Bismuth and zinc are good astringent preparations of the mild type. This is a specimen of Anderson's bismuth preparation; you see it makes an excellent smooth ointment.

When we need something more penetrating mercury is extremely useful, only it must be remembered that with a large surface there is danger of absorption and mercurial poisoning.

I think the dilute white precipitate ointment in our pharmacopœia answers every purpose.

But it is not sufficient to allay the inflammation; often enough the eczema is chronic or becomes chronic. There is less weeping, but it is none the less irritable and very obstinate. Then the stimulating drugs are needed. This step in treatment is an important one. I like to know something about the case before I use them, even though my first impression may be that the skin will bear them, and I always begin with the soothing remedy first, and then add to it later some tar. This tar preparation I try first upon a small area, and if all is well, then adopt it.

Equal parts of the diachylon and tar ointment make a good routine application. Bear in mind the staining and odour of the tar, and warn the mother of them.

The Ung. glycerini plumbi subacetatis of the British Pharmacopœia is an excellent ointment, often healing when tar and mercury fail; it is also very soothing.

Lotions.—As yet I have not spoken of lotions, but I very frequently use that well-known lotion—lotio calaminæ—for subduing acute eczema on the body. It clogs the hair, and for this reason I never use it for the head of an out-patient.

℞	Zinci oxidi	gr. xxx.
	Calaminæ prep.	gr. xxx.
	Glycerini	℥.xxiv.
	Liq. calcis	℥.xxiv.
	Aquæ rosæ	℥j.

For chronic irritable eczema when the skin is not very sensitive a good lotion is—

℞	Creolini	℥ss.
	Aquæ	℥j.

to which may be added, in cases where the skin is very dry, a certain proportion of glycerine, about ℥ij to ℥j. This should be thoroughly dabbed on the irritable region.

I have found, as a rule, ointments answer every purpose well, but it must be admitted that in very acute cases lotions may be better tolerated. Then I should use for the head *Lotio plumbi* ($\frac{1}{2}$ strength), applied on linen which is kept moist, and *Lotio calaminæ* elsewhere. Speaking of lotions generally, you will understand that a suspended powder, such as the calamine in the calamine lotion, is an assistance when there is much "weeping"; but if the eczematous discharge is very sticky, pure olive oil or some thick lotion would be better either than a powder or a mere fluid lotion.

Internal remedies.—Internal remedies are various. It may be that there is alimentary disturbance, possibly vomiting or the passing of green undigested stools. These disturbances are corrected by prescriptions such as rhubarb and magnesia or rhubarb and soda, or a small dose of grey powder, followed by a few drops of castor oil in a mixture. The urine is sometimes highly acid, and then 3 to 5 grains or more of citrate of potash are useful.

Mr. Malcom Morris has advised in very acute eczema small doses of antimony wine. Infants, as a rule, take it well, but it may cause vomiting and collapse. The need for it in infantile eczema is quite exceptional.

Quite a different order of remedies is needed for the children who are wasted, anæmic, and perhaps underfed; these will need quinine or cod-liver oil, or cream and raw meat juice.

Earlier in this lecture I spoke of the diet of infants with tendencies to eczema, and dwelt upon the importance of a plain milk diet in the acute eczema.

You will, I think, find among these details some, at any rate, which are of practical service.

LECTURES ON DISEASES OF CHILDREN. By ROBERT HUTCHISON, M.D., F.R.C.P. (London: Edward Arnold.)

THESE lectures, which were originally published in our columns, deal in a graphic manner with certain aspects of disease as it presents itself in childhood, and with certain diseases peculiar to children. Many excellent text-books have now attained to such vast proportions that the young practitioner is appalled at the prospect of having to read another enormous volume on this special subject. We advise him to put the big volume in his library for reference purposes, and to master thoroughly the contents of this work of Dr. Hutchison's. The effort will not be a prolonged one, and he will have thus acquired an acquaintance with disease in children which will serve him in good stead for a lifetime. Possibly he may be misled by the graphic style of the author, which depicts such clear-cut clinical pictures that one feels there is nothing more to be said and nothing more to be learned. Of course, much has to be learned at the bedside of the patient, but many a practitioner will be happier in that situation if he has Dr. Hutchison's lectures at his fingers' ends. For instance, one subject dealt with in this volume is fever, which may stand alone as a symptom and puzzle the doctor called in to treat it. What is he to think of and what is he to look for? If he follows out the course suggested, he will examine for (1) acute specific fever, (2) pneumonia, (3) acute gastritis, (4) acute rheumatism, (5) acute osteo-myelitis, (6) acute tonsillitis, (7) enteric fever, and (8) acute pyelitis. If he remembers these and the distinguishing features of each, it will very rarely occur that an indefinite form of pyrexia cannot be traced to its source. Diseases as well as symptoms are described, and the difficult subject of the anæmias of early life is most fully treated. The mental affections of childhood, both congenital and acquired, are also fully discussed, and their physical characteristics depicted in a series of excellent photographs. In fact, wherever possible the text is illustrated by photographs, which add materially to the value of the work. The only regret we have to express is that this book was not available when we began the study of diseases in children.

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A CLINICAL LECTURE

ON

THE EFFECTS OF SYPHILIS UPON THE NERVOUS SYSTEM.*

By W. ALDREN TURNER, M.D., F.R.C.P.,
Physician to Out-Patients, and at King's College Hospital.

GENTLEMEN,—I propose to-day to give you a short lecture and demonstration upon the effects of syphilis upon the nervous system. In the first place, it should be thoroughly understood that the syphilitic poison affects the nervous system in two ways. It induces what are known as the early and the late manifestations; such classification being based upon the time after infection, when nervous symptoms first make their appearance. The early affections are chiefly of the nature of vascular lesions, such as endarteritis or periarteritis leading to thrombotic occlusion and paralysis; or small-celled exudation or gummata inducing the convulsive phenomena. The late syphilitic affections are illustrated in the degenerative diseases, the two best known of which are locomotor ataxy, or sclerosis of the posterior columns, and general paralysis of the insane, by many regarded as one and the same disease, implicating originally different parts of the cerebro-spinal apparatus, and presenting a series of symptoms by which they may be, in the majority of cases, distinguished.

If one now inquires briefly into the time after syphilitic infection before nervous phenomena make their appearance, it will be found that such phenomena may appear at any time after infection. For example, there are cases on record in which hemiplegia has arisen within a couple or three months after infection, showing that syphilitic vascular affections of the nervous system may be unusually early manifestations of the disease. In

* Delivered at the National Hospital for the Paralysed and Epileptic, Queen Square, W.C.

many cases, indeed in the majority, they are early manifestations of the action of the syphilitic virus, and that is the second point to which I wish to call your attention. But there is another point, with reference to the onset of symptoms after infection, which is of interest, and it is that the degenerative diseases which are supposed to be invariably later in their onset than the vascular affections may and do arise in some cases earlier than the vascular or specific lesions. In other words, you may find two patients, both of whom have been infected with syphilis, presenting, on the one hand, hemiplegia arising ten years after infection, and, on the other hand, locomotor ataxy coming on five years after infection. So if you describe or classify syphilitic affections according to the time of onset after infection, and call the vascular lesions "secondary" and the degenerative lesions "tertiary" manifestations, there will be confusion. It, therefore, seems to me to be a misnomer to apply the terms "secondary" and "tertiary" to syphilitic manifestations of the nervous system for the reasons just given. It is better to describe them as vascular and degenerative; the vascular lesions being endarteritis, periarteritis, and gummata, while the degenerative form the pathological basis of tabes and paresis.

I propose to devote this lecture entirely to a consideration of the early syphilitic affections of the nervous system, and I will briefly mention them in the following order: (1) *Arteritis*, taking two forms—(a) endarteritis obliterans; (b) periarteritis, or small-celled effusion around the arterioles. The former leads to vascular occlusion through thrombosis, and the latter to tumour formation through the development of gummata. (2) In the second place we have the great specific lesion pathologically known as diffuse *meningo-encephalitis* or *meningo-myelitis*, according as to whether the brain or spinal cord is implicated. I propose to show you to-day cases illustrating the effects of endarteritis obliterans, the common symptom of which is hemiplegia; also cases of diffuse meningo-encephalitis and meningo-myelitis, and some instances of syphilis as it affects the spinal cord.

1. *Symptoms characteristic of syphilis*.—If a case comes before you complaining of hemiplegia or convulsive seizures, are there any symptoms by which you may form an opinion that you are

dealing with syphilitic causation? In other words, are there any phenomena characteristic of syphilis as it affects the central nervous system? Although there are no absolutely pathognomonic signs of a syphilitic lesion, there are some suggestive of it, and it is worth remembering them because they may lead you on to the right lines in otherwise difficult or complicated cases. First, there is an *association or succession of symptoms suggesting a double or multiple lesion*. If you have reason to believe from the symptomatology that you are dealing with double or multiple lesion, the case is probably syphilitic. This characteristic is well illustrated by the following case:

CASE I is a man, æt. 28, who contracted the disease in 1899 and was treated for a year. In 1900 he began to suffer from the characteristic headache which will be described, a headache which persisted for months, and which did not resolve under ordinary iodide treatment. A little after the onset of the headache he developed unsteadiness in gait, and in the year following, 1902, paralysis of the right third nerve. At the same time there was some indication that his mental faculties were not what they should be; there was loss of memory and confusion of ideas—in fact, a delusional condition, which is one of the common features of meningo-encephalitis. In November, 1903, he had two epileptic fits, and on December 31st, 1903, he was admitted to this hospital. His condition on admission was that he had paralysis of the right third nerve, which you see still remains as a permanent condition. You observe that there is no movement at all of the right globe in an upward, downward, or inward direction. He also has divergent strabismus, which is associated with over-action of the right sixth nerve, and there is a dilated, inactive pupil on the right side. On admission, in addition to the paralysis of the right third nerve, there was a well-marked right-sided facial palsy, which has now disappeared. He had weakness of both legs, a spastic gait, difficulty in emptying the bladder, and very considerable mental deterioration. That was his condition at the end of last year. His memory for recent events is very bad, but fairly good for things which occurred years ago. His gait is good, and there is no Romberg symptom. The right knee-jerk is more active than the left. The movements of the arms are steady, and his grasp is good.

So that this man has shown a very remarkable degree of recovery from a number of symptoms which characterised his condition on admission to the hospital. It is not possible to explain this series of phenomena—right third nerve palsy, right seventh nerve palsy, bladder trouble, and the mental phenomena—by any other than a multiple lesion of syphilitic nature. Clearly we are dealing with a condition in which there is a multiplicity of lesions, and it is probably a meningo-encephalitis involving the third and seventh nerves, with implication of the crura cerebri, and probably meningeal extensions lower down than the decussation of the pyramids.

The second point lies in the nature of the onset and the course of the disease. That is to say, a syphilitic lesion is most probably *sub-acute in its onset and sub-chronic in its course*; in other words, it does not present the features of the sudden myelitis due to bacterial causes, nor does it partake of the character of the chronic degenerations which are seen in disseminated sclerosis.

It is scarcely necessary for me to specially illustrate the subacute onset and the subchronic course, as all the cases presented to you fall into this category. The third is probably the most characteristic of all, *remission and relapse of the symptoms*. There may be a hemiplegia having the usual characters, which clear up after lasting six weeks or a couple of months, and the patient then seems to keep well for six months, when he has another hemiplegia on the same or on the opposite side; or after six months he may have an oculomotor paralysis, or he may develop paralysis of his limbs. Case 2 illustrates in a characteristic fashion this feature.

CASE 2.—This is a man æt. 30 years, who contracted syphilis six years ago. Two years ago, or four years after the original infection, he suffered from temporary aphasia with twitching of the right side of the face. That lasted for a short time on and off, and eventually disappeared under treatment. One year ago he developed loss of power on the left side of the body. That condition improved after a few days and eventually disappeared. Six months ago he developed an attack of aphasia and left-sided hemiplegia, which is the condition for which he has been admitted into the hospital. So in the course of two years he has had three attacks of hemiplegia, from each of which there

has been complete recovery. Still, notwithstanding the results of treatment, he continues to have transitory attacks of left-sided or right-sided hemiplegia, a condition due of course to temporary blocking from endarteritis obliterans, and having the characters which I have mentioned: a tendency to resolution under treatment, but subsequent relapse, the relapse not necessarily being in the same limbs or even on the same side of the body as in the previous attack. The first attack, you will remember, was right-sided, and the second attack left-sided, and his present attack is also left-sided but with aphasia. The left knee-jerk is in excess of the right. His articulation is slurring, but it does not show the characteristic tremor of general paralysis.

The fourth feature is an important one from the point of view of prognosis, namely, *variability and uncertainty in the results of treatment*. This is an important point, because it is usually said that syphilitic lesions resolve readily to iodide and mercury. Many of them do, but quite a number do not. In this very fact you have an indication that you are probably dealing with a syphilitic lesion of a virulent or malignant type, where instead of, for example, ordinary gummatous meningo-myelitis you have a hæmorrhagic variety.

One of the peculiarities of syphilis, one of its distinctive features, is its uncertainty. The other day a case was brought to my notice in which, in spite of the most energetic treatment—30 grains of iodide three times a day—there developed extensive cerebral hæmorrhage, with death. It is always well to bear in mind that there may be a malignant form of cerebro-spinal syphilis, and one which will not respond to treatment in the ordinary way. Or you may find a case of hemiplegia which has resolved satisfactorily to treatment, but in which a paraplegia may develop even during the administration of large doses of iodide of potassium and mercury.

These, then, are four general features which I would lay before you as suggestive in some cases of a syphilitic affection of the nervous system.

Prodromal symptoms.—Syphilitic affections of the brain usually manifest themselves by certain prodromata, and the chief and most characteristic and most constant of these is undoubtedly headache. And it is a headache of a very special type. It is said to be of an agonising character; it is described as a sensation as if the head were being

gripped in a vice. It comes on in the late afternoon, is very severe towards evening, and passes away in the early morning. By means of those characters you are able, almost with assurance, to separate the specific headache from the headache of neurasthenia. This latter headache is at times a severe headache; it is worst in the morning, it diminishes in the late afternoon, and it has largely passed away by evening. Associated with this form of headache there is often insomnia; you find that the person is really sleepless owing to the intensity of the pain. And with the headache and insomnia, though not necessarily from the commencement, but usually before any serious paralytic condition occurs, there is sometimes found apathy and mental torpor. It may therefore be said that headache, insomnia, and mental apathy and torpor are the most frequent prodromata of an attack of so-called cerebral syphilis. And an interesting feature is that as soon as paralysis appears, the headache, insomnia, and very often the mental torpor also, entirely vanish.

In the case, therefore, of a young adult suffering from these prodromal symptoms there may co-exist endarteritis obliterans, with the result that during sleep thrombosis takes place, and in the morning the patient finds himself paralysed down one side. Now, does such hemiplegia present any features by which you may say that it is probably syphilitic, in contrast to that which occurs as the result of renal disease and cerebral atheroma? There is no peculiarity by which it may be said that this or that case of hemiplegia is of syphilitic causation, other than the points which I have already mentioned. You may not, however, have a complete form of hemiplegia; there may be unilateral paræsthesiæ with numbness or tingling on one side of the body, with or without slight motor weakness, which passes away in the course of an hour or two, and in a few hours the patient may have recovered from the distress. You may therefore have as a result of arterial disease all degrees of one-sided weakness, from a slight and transitory paræsthesia to complete and permanent hemiplegia, the cause being either a very temporary ischæmic condition or a complete blocking and subsequent softening.

CASE 3. *Endarteritis obliterans—hemiplegia.*—I will now show you a case which illustrates the condition just described. The patient is a man

æt. 37 who was infected with syphilis in the year 1897. In 1903 he had ulcerations and lumps on his legs, and he also had bone pains in his legs, clearly some gummatous condition with periostitis. After the ulcerations and pains had made their appearance he began to develop headaches, which had the characters I have mentioned above. In April of this year it is recorded that he went to bed one night, and in the morning found that the whole of his left side was absolutely paralysed. There was at the same time some difficulty with his speech. He knew what was said to him, but he was told that he talked "silly." When he walks you will notice a slight dragging of the left foot. His arm seems to have recovered better than his leg. He has still left-sided headache. There seems to be occasional trouble with his speech. He has been treated in the ordinary way, and has so far made a satisfactory recovery. Here is a case in which cerebral symptoms appeared six and a half years after infection, and were preceded for nearly a year by intense headache. Headache must therefore be regarded as a danger-signal of the most important character in connection with these cases, and the recognition of the true cause of headache in a person who otherwise has not been subject to it will, in the majority of cases, avert some serious condition. Although endarteritis obliterans occurs and gives rise to occlusion of the blood-vessels, in many cases it is not the single condition which was seen in the above case. It is often, as I say, associated with some other affection; there are double or multiple lesions, and therefore you may find, in addition to hemiplegia, cranial nerve palsies, or mental symptoms, such as I will refer to shortly. And I now show a case which demonstrates, as the pathological foundation of the clinical group of symptoms, some multiple specific condition, an endarteritis with probable diffuse meningo-encephalitis.

CASE 4. *Multiple lesions.*—The patient, æt. 25 years, contracted syphilis in the autumn of 1902, some fifteen months before the onset of his present condition. At the end of 1903 he developed a complete right hemiplegia, with aphasia. He had not suffered from headache before this condition came on. When admitted to hospital in April of this year, he was in a condition of considerable mental stupor, with loss of memory, so that it was difficult to make out any coherent history. But

the facts, as obtained, are that at the end of 1903 he developed complete right hemiplegia with aphasia. In March of the present year he had an epileptic fit. In April he complained of some loss of power down the left side, especially in the left leg, accompanied by rectal and bladder trouble. So we have no doubt that in this case, in addition to the endarteritis which gave rise to the primary right hemiplegia, he has some diffuse lesion affecting the cerebro-spinal system. The reflexes indicate that there is a spinal lesion in addition to the cerebral. He has active knee-jerks on both sides, the left knee-jerk being more active than the right, and he has a double extensor response. I show him especially to point out the intensity of the right-sided paralysis with aphasia, the fact that after the onset of the paralysis he had an epileptic fit, and the fact that notwithstanding the treatment which has been conducted at this hospital since April, 1904, he has developed further symptoms of a spinal character, a point to which I shall refer later in detail, because it illustrates the uncertainty of treatment in some cases. You may be treating a case of cerebral syphilis according to all known standards, and yet the patient may develop either another hemiplegia or a paraplegia during the course of the administration of the iodides and mercury.

We now come to briefly consider the second series of syphilitic manifestations, the gummata, or focal lesions. The symptom which distinguishes a gummatous lesion of the cortex from a vascular one is the occurrence of localised convulsions, or Jacksonian epilepsy. A gumma is the pathological expression of the focal lesion, and the clinical symptom is Jacksonian epilepsy. Of course a gumma situated subcortically will not give rise to Jacksonian convulsions but to subacute progressive hemiplegia. I cannot show you a case illustrating either the one or the other just at present. But in speaking of this condition I would say that so characteristic is Jacksonian epilepsy of a syphilitic cortical lesion, that all such cases should be treated primarily by iodides and mercury. Of course, all Jacksonian fits are not due to cerebral gumma; they may be due to any other form of tumour, and many of them are; but it is a good rule to treat all cases of localised convulsions by means of anti-syphilitic measures for a month or six weeks. If the lesion is syphilitic, the symptoms rapidly clear up and the patient makes a good recovery.

If he does not, the chances are that it is a gliomatous or fibro-sarcomatous tumour, and the case lends itself for operation.

I now come to the third form of syphilitic lesion, that which is known, if occurring in the brain, as meningo-encephalitis, and if occurring in the spinal cord, meningo-myelitis: a gummatous small-celled infiltration affecting the pia-arachnoid and subjacent nervous tissue. If it is in the brain, it may be either cortical or basal. If cortical and Rolandic, you get Jacksonian epilepsy. If it is basal, you will probably find paralysis of some cranial nerves, usually the oculo-motor. Then there is meningo-myelitis, a like condition affecting the pia-arachnoid of the cord, with implication of the subjacent white matter; as it is usually peripheral, and most commonly affects the lateral column, it is known as peripheral meningo-myelitis.

CASE 5. *Diffuse meningo-encephalitis*.—I now show you a case in which the lesion is probably a meningo-encephalitis. As the patient has responded well to treatment, it is not possible to demonstrate the mental condition. He is 38 years of age, and he contracted syphilis at the commencement of 1903. Within a year of infection he developed severe headaches, pains radiating from the occiput to the temporal region. In March of the present year they became very severe, and towards the end of March he suffered from constant vomiting. This passed off, and at Easter the mental condition which I shall describe came on. With the onset of mental symptoms he developed an unsteady gait, with some tingling in his legs, but no paralysis, no paraplegic or hemiplegic phenomena. The mental condition was one of defective memory; he had delusions and hallucinations, though the notes do not state what the delusions were. He does not remember what state he was in, and he does not remember coming to the hospital. He says the first thing he remembered was that a patient in the ward was going to be operated upon, and that was about a fortnight ago. So that probably he was for three weeks in a condition in which he had no idea of time and place. There has been no palsy of any cranial nerves. The pupils react well to light. The knee-jerks are somewhat brisk. There is slight tremor at the tip of the tongue. He is able to whistle. There is no Romberg symptom. Here is a case in which within twelve months of syphilitic infection a

serious cerebral condition arose, which appears to be of the nature of meningo-encephalitis involving some part of the cerebral cortex other than the Rolandic area.

Before passing more particularly to the subject of spinal syphilis, I would mention a condition which may lead to very considerable difficulty in diagnosis. There has been described a condition in which you are dealing with syphilitic dementia or pseudo-general paralysis, a malady which is difficult clinically to distinguish from general paralysis of the insane. But there are two or three points which might be given as guides for differential diagnosis. A person suffering from syphilitic dementia, or pseudo-general paralysis, rarely has any grandiose ideas; he rarely presents any tremor, which is so characteristic of general paralysis of the insane. Usually, there is present some local paralytic phenomenon such as oculo-motor palsy, hemiplegia, monoplegia, or aphasia. And lastly, he responds as a rule satisfactorily to treatment.

As mention has already been made of meningo-myelitis, the common form of syphilitic affection of the spinal cord, a case illustrating the clinical phenomena will now be brought before you.

CASE 6. *Peripheral meningo-myelitis.*—The patient is 39 years of age, and contracted syphilis ten years ago. Six months ago, or nine and a half years after specific infection, he developed weakness of the right leg, with slight incontinence of urine. Three weeks ago—that is to say, at the end of April, 1904—he noticed numbness and weakness of his left leg. There is rigidity of the limbs, chiefly on the right; exaggerated knee-jerks, double Babinski sign, and ankle clonus. There is also a little trouble in starting the micturition act. There are no sensory changes, although very carefully tested for. I mention this particularly because paraplegia commencing in one limb suggests another form of specific affection which I propose to deal with presently, thrombotic occlusion, involving the cord upon one side, both grey and white matter, and producing what is known as the Brown-Séquard phenomenon. But here it is clearly stated that this man has no sensory defect, and no doubt we are dealing with peripheral meningo-myelitis. He is having the usual treatment, with local faradisation and massage.

There may, however, be more extensive implication of the spinal cord than what is illustrated by

the previous case. Complete or partial transverse myelitis may occur or produce a more pronounced form of paraplegia, in which both motor and sensory paralysis is found, as illustrated by the following case:

CASE 7. *Transverse myelitis.*—This man is 27 years of age, and he contracted syphilis eight years ago. Five years ago he had a very slight attack of weakness, chiefly of the left foot, from which he recovered, and two years ago he developed the paraplegia which you now see. The gait is of the ordinary spastic type. The knee-jerks are very active. He has double Babinski sign, and some interference with sensation in the limbs and the trunk. He feels a sharp pinch as a touch, and on pulling the hair of his leg sharply he feels it as merely a touch. On applying the heat test he thinks both test tubes are cold. He has therefore got therm-anæsthesia combined with analgesia, but retention of tactile sensation. In this case, therefore, there is a more extensive transverse myelitis, from which he is steadily recovering.

The Brown-Séquard symptom.—This consists of loss of motion of one lower limb and loss of sensation of the opposite limb. This clinical combination is due to thrombotic lesions involving one side of the cord. If you have a destructive lesion involving one half of the spinal cord, you will have motor paralysis of the leg on the corresponding side, and analgesia of the limb on the opposite side, for the reason that the sensory fibres which come in from the lower limb decussate in the cord, if not immediately on their entrance, shortly afterwards, and pass up on the opposite side; whereas the motor fibres cross high up at the pyramidal decussation, and hence a lesion involving, for example, the right side of the spinal cord produces paralysis of motion in the right leg and paralysis of sensation (in general terms) in the left. I have made a short abstract of the symptoms of the following case because the history is a long one.

CASE 8.—The patient is 47 years of age, and in August, 1903, he began to notice dragging of the right leg, with pins and needles. In October, 1903, there is a similar phenomenon recorded in the left and trouble with micturition. He was admitted here in January, 1904, and during the course of mercurial treatment in February he became partially paraplegic, with the result that he had loss of sensation in the right leg and loss of motion in the

left, showing that we were probably dealing to a large extent with a lesion on the right side of the spinal cord.

The Brown-Séquard symptom is not uncommon—at least, it is more common than one would expect from the small notice taken of it by the text-books—and it is seen chiefly in specific conditions. After syphilis, the most common course is tumour formation within the spinal marrow. In a lecture* I gave on the diagnosis of tumours of the spinal cord, I pointed out to you that the Brown-Séquard phenomenon when met with is suggestive of either tumour formation within the cord or a thrombotic occlusion of the spinal blood-vessels.

I now come to say a few words on *prognosis*. In the course of the remarks which I have already made you will have gathered something about prognosis. But I would like to say that the prognosis in cerebro-spinal syphilis is not quite so satisfactory as one would gather from a consideration of the text-books. I think we may say that only one third of the cases of cerebro-spinal syphilis are cured. A small percentage, some ten or twelve per cent. die, and the others are crippled for the rest of their lives. Of the various forms of cerebro-spinal syphilis the most satisfactory for treatment is Jacksonian epilepsy, or cortical meningo-encephalitis; after this come basal lesions, though paralysis of the cranial nerves may last a long time. In a case shown you there has been no recovery from oculo-motor palsy, although there has been extensive recovery in regard to the other symptoms. The least favourable are the vascular lesions, or those hemiplegias arising from thrombosis with subsequent softening.

Treatment.—There is no method of treating syphilis of the nervous system other than by the ordinary laws which guide the treatment of syphilis in any other part of the body. But there is a system which has been adopted in connection with this condition which I might refer to, and that is the use of mercurial inunction at the spas which have sulphur waters as their chief attraction. The course of treatment at Aachen is the one which is the standard for most other spas, and it certainly leads to satisfactory results. There they have three courses of treatment: a month, a two-month, and a three or more months' course. The ordinary course of treatment is two months, during which

time one to one and a half drachms of mercurial ointment are rubbed in daily, along with a daily immersion in the hot sulphur waters. If there are paralytic phenomena, such as hemiplegia or paraplegia, local faradic and galvanic applications and massage are added.

Treatment by inunction may be carried out at a patient's house or in hospital, the preparation used being either the blue ointment, the oleate of mercury, or the mercury vasogen, in one to one and a half drachm doses daily. At the same time, the iodides are administered by the mouth, while hypodermic injections of strychnine and arsenic are often of material service should paralytic phenomena be present.

Owing to the great uncertainty in the results of treatment if continued for an indefinite period, it is preferable to discontinue the administration of the drugs for short periods, two months' continuous treatment being considered sufficiently long in the majority of cases. During the period of respite, Donovan's solution or Easton's syrup may be given with great advantage.

It should also be borne in mind that the most pronounced forms of cerebro-spinal syphilis, such as hemiplegia and paraplegia, may occur during rigid antisyphilitic treatment.

THE THERAPEUTICS OF SOME COMMON AILMENTS.*

By LEONARD WILLIAMS, M.D., M.R.C.P.,
Assistant Physician to the German Hospital.

GENTLEMEN,—I ought, perhaps, to explain what I mean by the title which I have chosen for this lecture. By a common ailment I do not necessarily mean a slight ailment. Some of the maladies whose treatment I propose to discuss with you are, potentially, at any rate, serious enough; but as being almost of daily occurrence in a large practice, and as being therapeutically outside the scope of most of the text-books, I have thought that their consideration might not be altogether unprofitable.

The commonest of all ailments is probably the "common cold," which is the vulgar expression for a catarrh affecting the naso-pharynx, the larynx, or

* Vide CLINICAL JOURNAL, June 8th, 1904.

* Delivered at the Medical Graduates' College and Polyclinic.

the larger bronchial tubes. In that it suggests that cold or chill is the main factor in the causation of the ailment, I regard the term "cold" as not only unscientific but positively dangerous. If we would understand the nature of the common cold, as we must do if we wish to treat it intelligently, it is absolutely necessary that we should disabuse our minds of the primitive and ignorant fallacy which this term represents. The inflammatory state of the upper air-passages, which is the essential condition in a "cold," is brought about in precisely the same manner as the inflammatory states of the mucosa in other parts—that is, by irritation and microbic invasion.

Cold or chill has nothing whatever to do with the causation of the condition. A sensation of chilliness is frequently experienced by the patient, but this sensation is the result of the invasion, and it is only the ignorant or unthinking who could seriously assign it as a cause. The "common cold," then, is due, not to cold or chill, but to irritation of the air-passages. We know that chlorine and other gases will give rise to a "cold" because they act as direct irritants upon the mucosa. But chlorine and other gases are not present even in the grossly polluted atmospheres of churches, concert-rooms, theatres, and "tubes" in sufficient quantities to bring about this result. To explain the prevalence of "colds" and their epidemic character, it is necessary to assume that they are due to microbic activity. When we realise what an enormous number of bacteria are present in ordinary atmosphere, such an assumption is not a very large one, and it is by no means difficult to believe that under certain seasonal and meteorological conditions the particular germs which have a special affection for the upper air-passages should be present in increased numbers, and be endowed with greater activities. As opposed to the "chill" theory such an explanation has two merits. The one is that it embraces all the phenomena presented by "colds"; and the other is, that it enables us to treat them, not only intelligently, but with a degree of success which in itself furnishes strong testimony to the correctness of the theory.

Now, of what does this treatment consist? Well, if you only see the case early enough, it is not by any means a difficult matter to abort a "cold." This is done by the simple expedient

of washing the microbes out of the naso-pharynx by douching and gargling. It is curious to observe how few people know how to use a nasal douche. There are several patterns on the market, of which I have brought two to show you. I have selected them, not because I believe them to be better than any others, but merely because they are small and easy to manage. Let us take the smaller, which is called the "Birmingham nasal douche," and see how it is employed. Having filled it with the necessary fluid, the index-finger is kept on the air inlet, and the nozzle placed well inside the nostril. With the head thrown well back and to one side, the operator then raises the finger, and if the point of the nozzle is not too tightly pressed against the mucous membrane, the fluid will flow into the nostril. What becomes of it then depends upon one thing, and one thing only. If the mouth is kept widely open the fluid will flow out of the other nostril; if the mouth is kept closed it will find its way into the œsophagus or larynx, giving rise to effects which are always disagreeable and sometimes alarming. The direction to keep the mouth open should, therefore, always be dwelt upon. If the fluid does not flow out of the douche at all, the nozzle must be withdrawn slightly. With regard to the fluid to be used I need only emphasise one point, and that is that it should be warm, of a temperature not below 98° F. Of ingredients of a simple kind I prefer sulphocarbolate of zinc in weak solution—i.e. not more than two grains to the ounce, to any other; but any one of you could probably suggest something more elegant. Provided that it is bactericidal the exact ingredient matters little, though it is an obvious advantage that it should also be astringent. By no means the least of the merits of this method of dealing with a nasal catarrh is, that if the catarrh should be the first stage of an attack of whooping cough, you are adopting the measures best calculated to cut short the attack, to provide against the spread of infection, and to prevent the occurrence of the sequelæ to which the disease owes its gravity. So effectual, indeed, is nasal douching in the treatment of this malady, even when delayed until the whoop is established, that to neglect to advise and even to insist upon it is, in my judgment, to undertake a very grave and a wholly unjustifiable responsibility. A favourite formula with some for this purpose is:

℞ Acid, Boric ℥ij., or Acid Carbolic gr. x.
Glycerin ℥ss.
Inf. Rosæ Acid, ad. ℥vii.

When the catarrh commences lower down in the air-passages—*e.g.* in the larynx—the local abortive treatment is not so easy of application, and is consequently not so successful. Nevertheless it is always wise to try it, for if it produces any results at all, these cannot be other than beneficial. The means to this end which I have found most successful consist in the use of antiseptic oils, such as eucalyptus, well vapourised or atomised in a suitable apparatus, and inhaled vigorously and frequently.

In addition to these local measures it is desirable to increase the powers of resistance to microbic activity by freeing the primæ viæ. This is best done by a mild purgative and a hot bath, or, better still, a hot wet pack. If, in addition to the local symptoms, there should be evidence of constitutional disturbance, such as headache and a slight elevation in temperature, then a simple nocturnal dose of opium is invaluable. The form which I prefer is liq. opii sedativus, and of this at least twenty drops should be given. In influenza, taken early enough, I regard opium as almost specific, but even in common colds its effect in soothing the inflamed mucous membrane and in calming the irritated nervous system is most helpful. As a general tonic after a cold, nothing in my experience has proved so useful as quinine. And when prescribing quinine, I always do so in a fluid form. The powder is not only capricious in its behaviour, but as compared to a solution, it is much more liable to upset the stomach.

But if we do not see these cases in time to abort them what are we to do? Well, on this subject I have nothing to say which is at all modern. When once the inflammatory process is in full swing, the microbic activity is at an end; it is only the effect upon the air-passages that we can hope to influence. And if we wish our interference, in a process which is by nature self-terminating, to be really beneficial, we must not lose sight of the time-honoured division of expectorants into soothing and stimulating. If you stimulate the mucosa in the congestive period, the only effect which you can logically expect to produce is that of increasing the patient's sufferings; and, similarly, if

during the stage of free secretion you soothe the mucosa, the only reward for your activities will be a tardy and prolonged convalescence. When, therefore, the complaint is of rawness and a sensation of constriction either in the throat or behind the sternum, when the cough is hard, and accompanied at most by some slight mucus, when the skin is harsh and dry and the tongue coated, the only proper treatment consists in soothing or, as they are very properly called, depressing expectorants. A very old combination and a very excellent one is as follows:

℞ Vin. Antimon.
Vin. Ipecac. āā ℥x.
Spts. Æther Nitrosi ℥xxx.
Liq. Ammon. Acetat. ℥ij.
Syr. Limonis. ℥j.
Mist. Amygdal., ad. ℥j.

M. Sig: Every four hours, or, if the distress is great, half the quantity every two hours.

Those who make merry over what they call polypharmacy would doubtless describe this as a *mitrailleuse*, but this at any rate may be said of it, that its ingredients are neither chemically nor therapeutically incompatible (which is more than can be said of many prescriptions), while to its efficacy in relieving congestion and promoting secretion several generations of practical therapists have borne grateful and willing testimony. There is one counter-indication to the use of such a mixture to which I would specially direct your attention, and that is, the existence of any valvular disease of the heart in the patient for whom you propose to prescribe it. I have known at least one fatal result to ensue from neglect of this very obvious precaution. Ipecacuanha and antimony, be it remembered, are both very powerful cardiac depressants, and if we are careless enough to give them to a patient with an organ which is already labouring under mechanical disadvantages, we must not be surprised if by so doing we provide the proverbial last straw in the heart's burden. Where a complication of this nature confronts the practitioner, he must content himself with relieving the congestion by such means as poultices, hot packs, and purgatives, reserving his drug remedies for the relief of any symptoms which may be caused by the state of the heart. I must not be understood to mean that such means as I have just indicated should be applied only when there is valvular disease present.

On the contrary, I regard a purgative and a hot wet pack as among the very best subsidiary means of combating the condition, whether the intention be to abort an attack or to guide the inflammation to a rapid conclusion.

When the congestion is relieved and freedom of the secretion is established, then, and not until then, is the time for those stimulating measures which many people seem so anxious to prescribe. As a good example of an expectorant mixture of this class, let me remind you of one which is as time-honoured as that which I have just quoted ; it is as follows.

℞ Ammon. Carb.	grs v.
Tr. Camph. Co.	℥xx.
Syr. Scillæ	℥xxx.
Syr. Tolu	℥j.
Inf. Senegæ, ad.	℥j.

M. Sig. : Every four hours.

Now, if the types which these mixtures represent, the sedative and the stimulating, were more generally and more sharply distinguished, colds would not seem such interminable things to patients, and there would be less gaiety among dispensing chemists over the ignorance of doctors than now, unfortunately, exists. I once saw a prescription for a cold which I make so bold as to cite to you as an example of how not to prescribe. It ran thus :

℞ Ammon. Carb.	℥j.
Tr. Camph. Co.	℥ss.
Vin. Ipecac.	℥ij.
Spts. Ammon. Co.	℥ss.
Liq. Strychnin.	℥j.
Aquam, ad.	℥vj.

M. Sig. : To be taken three times a day.

This represents a disregard of the ordinary canons which is really original and arresting ; but the prescriber reached the topmost note of dangerous ineptitude when, as if to put the finishing touch upon so elegant a work of art, he finally tossed in the strychnine. In the presence of so much alkali the poisonous alkaloid would all have been thrown down, and the last two doses in the bottle, if it had ever been dispensed, would most effectually have stopped both congestion and secretion by putting an end to the patient.

I feel that I have dwelt rather longer on the subject of the "common cold" than the time at my disposal warrants. I must nevertheless venture

upon one more word ; and that is, to beg of you to impress upon your patients that draughts and chills are not the causes of the condition ; but that catarrhal states of the upper air-passages are microbic in origin, and that it is as true of air as it is of other things that "movement is life and stagnation is death."

The next subject to which I propose to direct your attention is that of sore throat. There are of course several kinds of sore throat and I wish I could say that the degree to which specialism in this department has attained had been productive of any corresponding degree of precise knowledge as to their varieties and causation. To the plain man, where it does not mean scarlet fever or some similar condition where accompanying symptoms are present to clear the issue, sore throat spells tonsillitis ; and with regard to a tonsillitis the first point to decide is whether or not it is diphtheritic. In these days of bacteriological investigation and antitoxin treatment the question may not seem to present the same importance as it did in the days when we were still without such assistance. But bacteriological investigation takes time, and reliable antitoxin is not always easy to procure, so that it is well to be prepared with a plan of campaign which leaves such luxuries out of account. I have, unfortunately, had more than my fair share of experience in diphtheria, and I can honestly say that I know of no condition which, in its slighter forms at any rate, is more difficult of diagnosis. It is, even now, no uncommon thing for a sore throat which has been dismissed as a passing matter, tardily to vindicate its true character by a legacy of alarming and even fatal paralysis. Apart altogether, therefore, from the question of preventing the spread of infection, a question whose importance and urgency I should be the very last to minimise, it is essential that we should not, if we can help it, fail to recognise a case of diphtheria when we see it. Now, there are two aids to diagnosis which, partly perhaps on account of the luxury of the bacteriological short-cut, seem to be falling into increasing disuse, of which, for this reason and as being easy of performance and capable of yielding information of the utmost value, I desire to remind you. The one is the state of the knee-jerks, the other the state of the urine. It is generally known, perhaps, that in diphtheria the knee-jerks are liable to disappear, and that in

the urine albumen is often present. But I don't think it is sufficiently realised that these phenomena, when they do occur, occur early, sometimes very early, in the disease, and that it is therefore our bounden duty to look for them in every case or sore throat, however slight, which presents itself to our notice. Now, let us suppose that we have detected such a case and that a considerable amount of precious time must necessarily elapse before any reliable antitoxin can be obtained. What are we to do? Taking the ordinary precautions as to isolation, etc. for granted, the first thing to do is to give the patient a mixture containing biniodide of mercury. Before the days of antitoxin I had learned to have so much confidence in this drug, which was, I believe, first suggested by my friend Dr. Luff, that I came to regard the occurrence of a case of diphtheria with something very nearly approaching to equanimity. The biniodide, as you know, is insoluble in water, but is freely soluble in the presence of an excess of iodide of potassium. The following is a convenient way of prescribing it:

℞ Hydrarg. Perchlor.	. . .	grs. j.
Potassium Iodid.	. . .	grs. xx.
Glycerin.	. . .	ʒij.
Aquam, ad.	. . .	ʒviiij.

In such a mixture a double decomposition takes place between the two salts, and the amount of resulting biniodide is rather less than the original amount of perchloride, so that each ounce contains rather less than $\frac{1}{4}$ grain. The ordinary tablespoonful is, therefore, a perfectly safe dose for an adult, and if its effects are carefully watched, it may be frequently repeated. The glycerine is added with the view of causing the mixture to adhere somewhat to the fauces, and of thus securing a local as well as a constitutional effect. The biniodide of mercury as a bactericide is four times as powerful as the perchloride, and it has no tendency, as the perchloride has, to throw down an inert albuminate when brought into contact with the tissues. Whether for these reasons, or because it is especially inimical to the Klebs-Loeffler bacillus in the same way that nitrate of silver is especially inimical to the gonococcus, there can be no doubt that, anti-toxin apart, HgI_2 is a far more effective weapon in combating diphtheria than any drug or inhalation or pigment which has ever been introduced.

When we come to consider the forms of tonsillitis other than diphtheritic, I have to confess to that absence of settled convictions which has recently caused so much stir in the political world. That tonsillitis or quinsy may be, and often is, a manifestation of true articular rheumatism, giving rise to endocarditis, and causing valvular disease of the heart; that it may, on the other hand, own no such relationship, and even after repeated attacks be followed by no such consequences; that under the name of "septic throat" it is very properly recognised as due to bad drainage; that not infrequently, especially in autumn, it seems to become epidemic; and that, finally, it often arises under circumstances so ill defined that it is forced to herd with a motley company of congeners and aliens in that enormous pigeon-hole labelled "chills"; these, and perhaps some other facts are familiar to us, but connection and co-relation between them there is none. Fortunately, however, the aspect of the matter which we are considering, namely, the mere utilitarian one of treatment, is but little affected by our ignorance, but before we discuss that question you must permit me to dwell for a moment upon one point in the diagnosis. There is, as I have said, nothing in the state of the throat itself to help you to determine whether a tonsillitis is or is not of rheumatic origin, and as the settlement of this question is of paramount importance to the patient, I would strongly urge that a careful examination of the state of the heart should be as much a matter of routine in a case of tonsillitis as it is in chorea or articular rheumatism. And in examining the heart, the feature to which particular attention should be directed is its size. The detection of any signs of dilatation, especially of the right heart, is of the utmost importance, for it enables you to deal with the condition while it is still amenable to treatment. If you wait until a murmur has declared itself, the time for effective interference may be already gone. With some people the examination of the heart is comprised in the use of the stethoscope; but auscultation is in reality far less important than percussion, and if you wish to detect the earliest signs of impending mischief, you will do well to bear in mind that most excellent clinical rule, "Eyes first, fingers next, ears last."

In the matter of the treatment of a tonsillitis,

the first point of importance to be observed is the degree of the accompanying fever. If this is slight, the fact should give rise to a strong suspicion of the case being diphtheritic, and steps should immediately be taken to settle the diagnosis by bacteriological examination. In most conditions a moderate elevation of temperature means a moderate degree of anxiety, but sore throat provides a notable exception to this very obvious rule, which ought always to be borne in mind, not only because of diphtheria, but also because some at any rate of the worst septic throats are often attended by a quite insignificant amount of fever. If the temperature is high, which in most cases of tonsillitis, other than diphtheritic, it usually is, the tincture of aconite has an excellent effect. When the thermometer registers 105° F. in a patient in whom we need not fear a certain amount of cardiac depression, Tr. Aconite, in doses of five minims every four hours, or, better still (where its effects can be watched) in drop doses hourly for a few hours, will bring down the temperature rapidly, and will confer a degree of comfort on the patient which is really remarkable. And the higher the temperature, the greater is the confidence with which you may prescribe the drug. If a tonsillitis is taken early enough it is quite possible to abort it by means of aconite alone. I have learned, however, not to depend on aconite alone. I find that it acts better, or at any rate that its action is not impaired by the presence in the mixture of other drugs directed against the local and constitutional aspects of the case. For instance, where the case is unquestionably rheumatic in origin, apart from the salicylates, upon whose importance I need not dwell, I have found guaiacum to be a most trustworthy remedy, and, in spite of the inelegance of the resulting mixture, I can fully recommend this formula.

℞ Potass. Chlorat. . . . grs. x.
 Tr. Aconite ℥v.
 Tr. Guaiac. Ammon. . . . 3j.
 Mucilag. Acac. . . . ℥xx.
 Aquam, ad. . . . 3j

M. Sig. : Every four hours.

As soon as the temperature has fallen the aconite should be discontinued; but the other ingredients, the chlorate of potassium and the guaiacum, may be persevered with for some time.

When a sore throat is neither diphtheritic nor

rheumatic it is always safe to treat it as due to some septic influence, and the treatment of such conditions is one of the most satisfactory things in all therapeutics. The following mixture, with such slight variations as special circumstances may suggest, constitutes what the advertisements of quack medicines describe as a sovereign remedy, one of the very few with which I am acquainted:

℞ Tr. Aconite ℥ij.-v.
 Potass. Chlorat. . . . grs. x.
 Liq. Ferri Perchlor. . . . ℥xx.
 Liq. Hydrarg. Perchlor. . . . ℥x.
 Glycerin. . . . 3ij.
 Aq. Chlorof. . . . 3ss.

M. Sig. : Every four hours; or, better, half the quantity every two hours, at any rate until the temperature falls.

As in the case of the previous mixture, the aconite should be discontinued as soon as the temperature subsides, and the other ingredients continued until the local conditions in the throat are satisfactory. This prescription owes its efficacy to its antiseptic powers. Few people seem to realise that liq. ferri mur. is, when taken internally, a bactericide of the utmost value—a fact to which Sir Isambard Owen, Dr. Amand Routh, and others have recently called attention ('Lancet,' October 22nd, 1904). It was originally suggested in sore throat because of its astringency, but this attribute would not even partially explain its almost magical effects in a tonsillitis of septic origin. The Liq. hydrarg. perchlor. is added with the view of accounting for any cocci which may escape the attention of the iron salt, and the glycerine to enable the mixture to remain longer in contact with the fauces than it would otherwise do. Chlorate of potass. is given more as a matter of routine than anything else. It has a reputation in inflammatory states of the pharynx, and if it does no good it certainly does no harm. Treated with an initial purgative of a few grains of calomel and by perseverance with this mixture, a tonsillitis which is neither diphtheritic nor rheumatic will yield completely in an astonishingly short space of time.

I had intended if time had permitted to deal briefly with some other subjects, notably cough and dyspepsia, but they are both large subjects and must, therefore, be reserved for another occasion. Before we part, however, I wish to refer to two

practical points in every-day practice. The one concerns the taking of temperatures, the other the giving of bromides. It does not seem to be generally known that the temperature when taken in the mouth is seriously affected by the ingestion, immediately before the observation, of both hot and cold fluids. If, for example, a patient with a normal temperature drinks a cup of very hot tea, the temperature in the mouth will be found to be raised* two or even three degrees, and some measure of the increase is still apparent even after thirty minutes have elapsed. In the same way, but not to the same degree, the ingestion of cold fluids will lower the temperature of the mouth; and the fact of the mouth itself being kept open for some time before the observation will also cause the register to be lower than the internal body temperature. For taking the temperature of a person fully dressed, the mouth is by far the most convenient situation, but it is also by far the least reliable. If the facts just mentioned were always borne in mind, a great deal of unnecessary alarm might be saved. I have more than once known a cup of hot tea transform a temperature of about 100° F. into one touching 102° F., a difference which may reasonably cause considerable anxiety.

Concerning the giving of bromides, what I have to say is this: They are useful for so many purposes, notably in calming the nervous system and producing sleep, that we are apt to overlook one very definite contra-indication associated with them. A bromide acts by causing anæmia of the brain and spinal cord, and, as a rule, it is perfectly safe to bring about such an anæmia. In old people, however, this can never be done with impunity. In them, even small single doses often give rise to curious mental symptoms, and anything in the nature of its regular exhibition is almost certain to be followed by unmistakable evidence of mental decay. I have known more than one case of senile dementia which was excited by the careless prescription of bromide of potassium, and so impressed have I been with its dangers in this direction that I make it a rule never to give the drug to any one over sixty-five years of age. This may represent an excess of caution on my part, but I would infinitely rather be over-cautious than accept the responsibility of unhinging a mind which but for my carelessness might have remained clear for months or even years.

* See Lazarus Barlow, 'Lancet,' October 26th, 1895.

THREE LECTURES ON SOME INJURIES AND DISEASES OF JOINTS.*

By F. C. WALLIS, F.R.C.S.,
Surgeon to Charing Cross, St. Mark's, and Grosvenor
Hospitals.

LECTURE III.

GENTLEMEN,—The treatment of *tubercular joints* is one of serious importance concerning which there is a variety of opinion. The improved surgery of to-day suggests an earlier operative treatment than was formerly the case for most joints affected with tubercle. The one exception to this is the hip joint. Here, owing to the anatomy of the joint and its deep-seatedness, the difficulty of dealing with the interior of the joint without serious disturbance and alteration of the muscles and structures in connection with it, and also having regard to the difficulty of establishing good drainage, it is a question whether this joint should be so freely dealt with as in the case of the other joints in the body. Another point of interest and importance is the fact that tubercular disease of the hip is one which soon gives rise to obvious signs both to the patient and those about him. A limp and pain, with wasting of the limb, occur early in hip-joint disease, and probably these indications become obvious before the disease is far advanced or any material destruction of the joint has occurred. In most of the other joints disease is, as a rule, far advanced before sufficient symptoms occur to draw attention to the matter.

There are two opposite schools for the treatment of hip-joint disease. There are those who advocate the early and radical removal of all tissues affected, involving the removal of the head of the femur and free removal of the whole of the lining membrane of the joint. On the other hand, there is a school which adopts the reverse treatment, relying upon rest, position, extension, proper diet, etc., for a cure in these cases. This treatment is carried out at the Alexander Hip Hospital and the results are most satisfactory. The patients are kept in bed, and if abscesses form they are opened and dealt with, but such a radical

* Delivered at the Medical Graduates' College and Polyclinic.

measure as excision of the joint is a last resource, which is rarely made use of. Great care is taken when these patients start to walk that a Thomas's hip-joint splint shall be worn, crutches are used, and an iron patten put on the sound foot keeps the damaged limb away from any chance of weight being put on it until all indication of active disease has disappeared for some considerable time, and until it is reasonable to suppose that firm fibrous tissue has developed. When this is supposed to have occurred the patient is very gradually allowed to walk, due notice being paid to whatever shortening may have been caused by the disease, and this is made good by a cork sole on the affected side. I have been particularly struck by the excellent results which have been obtained in the early cases where the only symptoms were a slight limp with possibly some pain at night and limitation of free movement. Such cases when treated on this expectant treatment do admirably well. The great point about the whole treatment is that the time taken is not considered; there is no suggestion of hurrying the patient on, but simply of watching the limb from week to week and month to month, for twelve or eighteen months or even two years, until the desired result is obtained. This treatment is particularly applicable to hip-joint disease because of the anatomical situation of the joint. If any extensive operation is undertaken for the radical treatment of tubercular disease of this joint, it is obvious that large planes of tissue must be opened up, and that the probability of removing all the disease is not great without very extensive operative proceedings. These divided tissues are then themselves liable to become infected with tubercle—and indeed this is an occurrence which not infrequently happens. If rest is resorted to, and any abscess which forms is dealt with by itself, it is obvious that the only tissue exposed when the abscess is dealt with is the abscess cavity, the walls of which shut off the surrounding tissue from further infection; and this is a point of some interest, because it would seem that when an abscess is formed in tubercular disease, it is more or less an expression of the fact that in the neighbourhood of the abscess the activity of the tubercular process is arrested. This is a conclusion which I have arrived at in the case of tubercular abscesses in connection with the spine. It will be found in the case of the spine that if the abscess can be satis-

factorily dealt with and prevented from getting septic, these cases after a prolonged rest in bed get well without any further extension of the disease. The same result is generally obtained in tubercular hip-joint disease by dealing with abscesses as they form, and keeping the limb at rest in the proper position with extension. By a proper position I mean that the limb is often fixed at an angle with the trunk, and the extent of this angle is seen on examination by placing the child flat on the bed with the spine touching it, and then noticing the angle at which the hip-joint is flexed to enable one to overcome the lordosis which would occur if the limbs were straightened. It is at this angle at which the extension must be affixed, and after a few days it will be found possible to lower the position of the limb until in the vast majority of cases the leg is ultimately straight. The various details with regard to the nursing and treatment of a case of hip-joint disease would take too long, and can only be thoroughly appreciated by watching the treatment of such cases. It is really with the object of upholding the expectant method of treatment in hip-joint disease that I have dwelt so long upon it.

In the case of the knee joint, owing to the position of the joint to its surrounding structures, and the easy access which it is possible to obtain to all parts of it, an entirely different method of treatment is to be advocated. Here, as a rule, the joint causes no considerable pain for some time, until the disease has well advanced, and marked changes are obvious with regard to the outline of the limb. It is remarkable to what an extent the disease can exist in the knee-joint without incapacitating the patient from getting about; and, although there is a certain amount of pain in connection with it, it is often not sufficient to incapacitate the sufferer. Cases of tubercular knee-joint disease go on for years without becoming in any way urgent as far as operative treatment is concerned. The question of waiting and resorting to rest and such like measures is one which requires careful consideration. My experience is, that in the case of the knee joint, when once the disease is well established, and after sufficient observations as to its activity have been made, no point is gained in waiting for some considerable time, such as is the practice with many. It will be found that in the end an operation has to be performed

under circumstances much more advanced, as far as the disease is concerned, than is desirable, and no real benefit has been derived by the long wait—in fact, rather the contrary. I have had many examples of this under my care, and perhaps the most striking is the following, which is typical of these cases of knee-joint disease :

Some years ago, when abroad, I saw a French boy with commencing tubercular knee-joint disease. It was limited then to the synovial membrane, and the boy did not have much discomfort from his condition. He was at that time *æt.* 14 years. I saw this boy on and off for the next six years, during which time I made various endeavours to get him to consent to an operation ; and we arrived so far that he came to England prepared to have it done, but on his arrival he was in a condition of such abject fear and misery that I was convinced that any operation, which must be extensive, would be quite possibly fatal. I then fixed him up in a Thomas's splint and sent him back to his own country. This was six years ago. The boy had grown into a man, and occupied an important position as steward of a club. I saw him at intervals for another three years, until he of his own accord begged me to take him in hand again, and even to remove the limb if I thought necessary. His mental attitude was now entirely different, and he made another journey to London, was placed in a Nursing Home with a nurse who could speak French to look after him, and he was then operated on. He was back at his work within three months and has remained in excellent health ever since, with no suggestion of any return of the disease in his knee joint. As the operation is one I am anxious to advocate in these cases of knee-joint disease, I must ask you to permit me to give somewhat in detail the various steps of the operation. A transverse incision was made across the middle of the patella for half way around the limb, the skin reflected above and below. The patella was sawn through and the fascial expansions on either side divided, thus thoroughly exposing the knee joint and the pouches of synovial membrane in connection with it. These synovial pouches were full of thickened synovial membrane, infiltrated with tubercle, and containing one or two small collections of pus. The whole of this membrane was cut away with scissors and the ends of the bone were carefully

investigated, and where the cartilage was eroded a sharp spoon was freely used and all tuberculous *foci* was dug out by this means. No attempt was made to do an excision ; the bones were not touched with the saw. When all the membrane was removed and the various tuberculous *foci* in the bones had been thoroughly cleared out, the whole surface was freely swabbed with pure carbolic acid. The immediate effect of this was to make all the tissues turn an ashy-black colour. But after two or three minutes the normal condition of colour returned and free exudation forthwith occurred. The patella was united in the ordinary way by fine wire, and the knee joint closed by interrupted fishing-gut sutures, except at either end of the transverse incision, where a good-sized drainage-tube was inserted. Plenty of iodoform gauze surrounded the tube, and the limb was bandaged to a ham-splint. The patient when in bed had the limb well raised. The drainage-tubes were removed at the end of thirty-six hours, and then two sutures, which were placed in the angles, were tied. The limb was re-dressed and placed on a splint ; at the end of a week the sutures were removed ; the patient was kept in bed a full month, but massage of the muscles was commenced at the end of the *second* week. Walking was commenced with crutches at the end of a month, and these were soon discarded for two sticks and then only one.

If a certain amount of cartilage has been left on both bones, it is quite possible that a limited amount of flexion and extension will be obtained. Sufficient "give" in the joint is often present, showing that, although fibrous ankylosis has occurred, there is no bony union.

I have performed this operation now on all cases of tubercular knee-joint disease for the last ten years with excellent results. The main point of interest about it is, that even in cases where the disease has made considerable inroads on the bone, yet if these places are thoroughly cleared out it is not necessary to excise any of the joint surfaces. The results of excision are not satisfactory in young children and lead to considerable shortening when done later in life. This free removal of infected tissues and the use of carbolic acid is quite effective in getting rid of the disease and has the great advantage of avoiding any shortening of the limb. Should bony ankylosis occur, it is not necessary to

have such an extent of bone in apposition as is brought about in an ordinary excision.

If you consider the knee-joint, it will be obvious that the absolute amount of bone in contact in any position of the limb is limited to that part of the articular cartilage of the femur which comes into contact with the cartilaginous surface of the tibia unprotected by the semilunar cartilages—quite a small area. When from any cause bony ankylosis occurs it is obvious that only this amount of bone will become adherent, and it is all that is required for the strength of the limb. Another point is that the patella unites readily after being sawn, and in those rare cases where some movement is possible it will prevent the marked flexion of the limb which must occur when the patella is removed, because there is nothing to counteract the full effect of the ham-string muscles. It is some years now since I first started this routine method in treating tubercular knee joints. I have seen or heard from all my patients from time to time, and so far, although in one or two instances there has been some suggestion of slight return, it has all disappeared after resting and no return of the disease has yet shown itself. I think it must be obvious that, provided it is thoroughly carried out, this method is far preferable to the ordinary excision.

Tubercular disease of the ankle joint is comparatively uncommon, and fortunately, a fair proportion of cases get well with rest sufficiently prolonged. In those cases where the disease is so far advanced that no good result is arrived at by rest, some operative procedure becomes necessary. The joint has been opened by the removal of the two malleoli, and thus exposing the articular surfaces and treating the diseased portion. Another more recent plan was to divide all structures in front of the joint, opening the joint from the front, and thus obtaining a good view of the interior and being able to deal with the condition effectively. This last operation is a difficult one, and although at the time a better result is possible, as far as the removal of the diseased area is concerned, yet the ultimate result is by no means satisfactory. The same remark is applicable to most cases where there is advanced disease of the tarsal joint. Unless such cases are treated in the early stage, it is rare that any permanent good is obtained by attempts at removal of the obviously diseased

parts; and although it may be only right to attempt a cure by this means, it is as well to be prepared for a disappointing result; even should the foot be saved, its condition is so altered, and the use of it so limited and fraught with pain and marked deformity, that it is to my mind a question whether it is not better to at once perform Symes' amputation through the ankle, thus obtaining a healthy stump and a rapid convalescence. With the aid of a skilful instrument-maker walking is made easy and comfortable. This is somewhat at variance with the usual axiom of surgery, which says that whenever possible a limb should be saved; and with that axiom we all, of course, naturally agree. But it is useless to save a limb, or part of a limb, which serves no useful purpose, and is a source of pain and a possible danger.

In the case of the wrist joint affected with this disease it is quite a different matter. Here, again, a large number of cases seen early are much benefited by prolonged rest, and possibly cured by this method. But if an operation is necessary excision of the wrist-joint, although a difficult and tedious operation, is one which is usually most successful, leaving a useful hand with free movements of all the fingers and a certain amount of movement in the region of the wrist-joint.

The elbow-joint, when seen sufficiently early, is best treated by means of a long incision over the olecranon process, which is exposed and sawn through and turned up with the triceps; the joint is then thoroughly exposed and defective tissues dealt with.

The superior radio-ulnar, articulation, which very often contains infected synovial membrane, because of its situation is apt to be overlooked. When the diseased parts have been removed and the whole joint brushed over with pure carbolic acid the divided olecranon is wired to the ulnar and the wound closed down, sufficient drainage being established for a day or two after the operation. Here at the end of a week passive movements should be begun in order to avoid ankylosis. This operation is by far the best in cases where the elbow-joint is diseased, but unfortunately, it often happens that the joint is so disorganised that nothing can be done except an excision of all the bones entering into it, and the result of this is often an extremely flail-like limb, which nevertheless may turn out a useful one.

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THE NATURAL HISTORY OF EXTRA-UTERINE PREGNANCY.

By ARTHUR E. GILES, M.D., B.Sc., F.R.C.S.E.,

Surgeon to Out-patients, Chelsea Hospital for Women;
Gynæcologist to the Tottenham Hospital.

GENTLEMEN,—I propose to confine my remarks to a sketch of the clinical aspects of tubal pregnancy, as they may present themselves to any one of us in practice. To serve this purpose I shall take a supposed case, and trace in outline its natural history, noting the various accidents which it may meet with in its career, and pointing out the symptoms to which each such accident may give rise.

The vicissitudes of the career of the tubal embryo are illustrated in the diagram, and may be expressed in tabular form as follows:

Course of extra-uterine pregnancy:

1. Early tubal rupture (third to sixth week). Foetus perishes.

2. Tubal abortion (sixth to eighth week). Foetus perishes.

3. Later tubal rupture (sixth to twelfth week).

I. Primary intra-peritoneal rupture.

(a) Foetus perishes.

(b) Foetus survives, and goes on as abdominal pregnancy to term.

II. Intra-ligamentary rupture.

(a) Foetus perishes.

(b) Foetus survives.

(a) Mesometric pregnancy goes on to term.

(β) Secondary intra-peritoneal rupture.

(i) Foetus perishes.

(ii) Secondary abdominal pregnancy goes on to term.

Leaving then on one side all discussion as to what can have brought it about, we start with the assumption that a fertilised ovum has become implanted in the Fallopian tube. For the first two or three weeks there may be nothing to indicate even that conception has occurred. The early morning sickness which is so characteristic of intra-uterine pregnancy is nearly always absent. The first indication, therefore, is the missing of a monthly period, and at this stage there is nothing to suggest that the pregnancy is not intra-uterine.

But dangers early await the extra-uterine ovum.

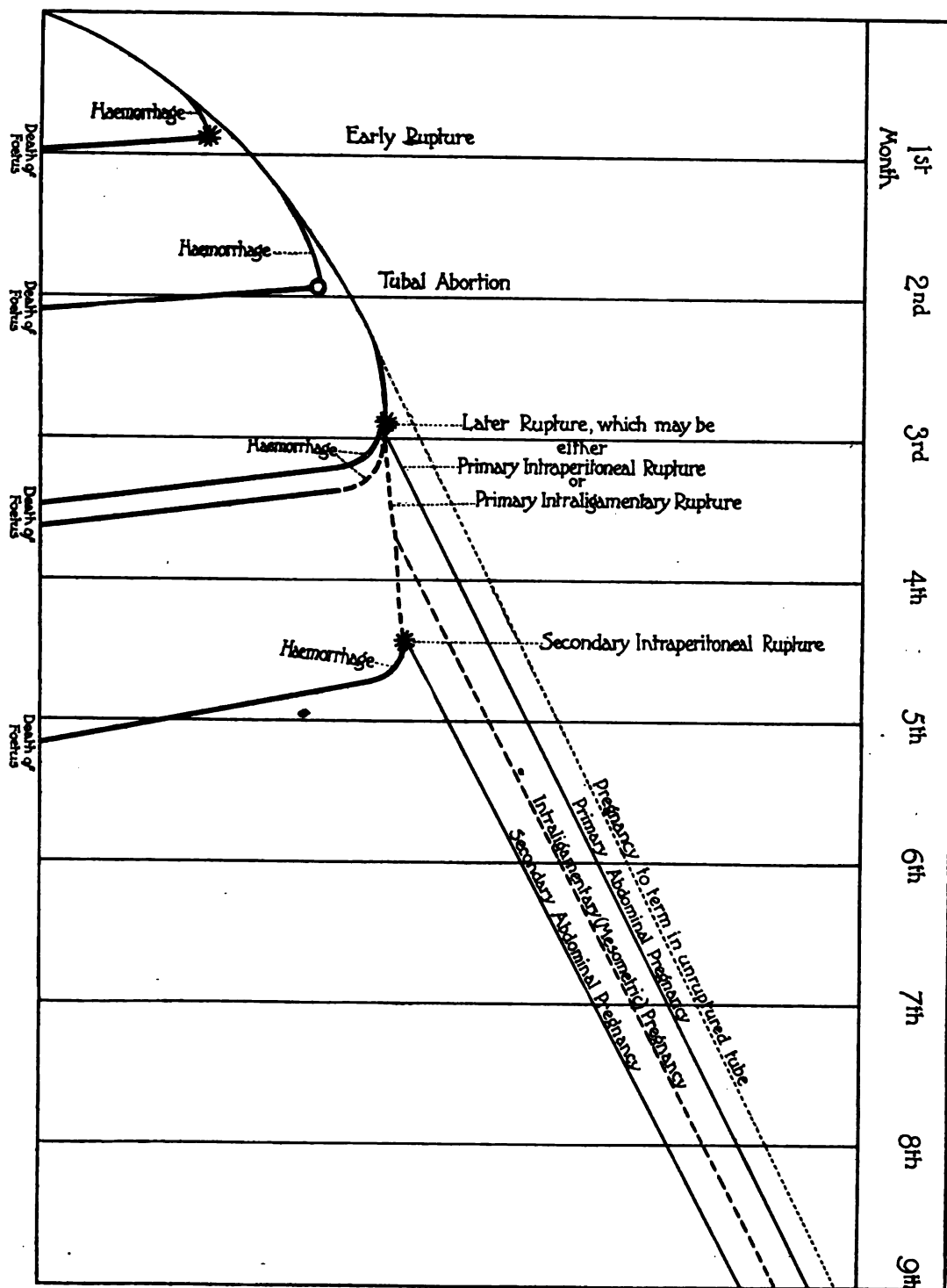
Early tubal rupture.—At four or five weeks, that is to say, one or two weeks after the first missed period, and sometimes even earlier, namely, at the time when menstruation is due, hæmorrhage may occur in the ovum, between the chorion and the amnion. The sudden increase in the size of the ovum may lead to the rupture of the tube, especially if the site of attachment of the ovum is near the uterine end of the tube; this event is signalled by a sudden dangerous collapse due to intra-peritoneal hæmorrhage, which may prove fatal in from twelve to forty-eight hours. Therefore a sudden and marked collapse with symptoms of intra-peritoneal hæmorrhage, coming on a week or two after a monthly period has been missed, should at once suggest an early ruptured tubal pregnancy; and it should be clearly borne in mind that under such circumstances a delay of a few hours in opening the abdomen may place the patient's life in jeopardy. There is here no difficulty in diagnosis; nothing but a ruptured tubal pregnancy can cause these symptoms. Moreover, the hæmorrhage is not commonly slight and gradual, under these conditions, leading to a pelvic hæmatocele; but it is sudden, copious, cataclysmic, desperate; and as an awful calamity it has hardly a parallel in surgery. An ovum into which hæmorrhage has occurred has been aptly called by Mr. Bland-Sutton a "tubal mole." It does not necessarily lead to the perilous pass just described, but may produce what is known as a tubal abortion.

Tubal abortion.—The presence of the ovum in the tube leads to closure of the abdominal ostium of the tube. The closure usually takes place earlier when the pregnancy develops in the outer half of the tube, but in any case it is usually complete by the end of the sixth week, although it may be delayed till the eighth. It is during this early period

that tubal abortion is apt to occur; the nearer the ovum is to the orifice, the greater is the risk of its being expelled. When it is situated in the isthmus of the tube, rupture is more likely to take place than abortion; and it is important to remember that rupture of the tube may occur even when the ostium is patent.

We will suppose, then, that the ovum is situated in the outer half of the tube, at the time when hæmorrhage between its membrane converts it into a mole; the attachment of the ovum becomes disturbed, leading to hæmorrhage into the tube, just as hæmorrhage follows the disturbance of an intra-uterine ovum. The blood is then expelled through the still patent abdominal ostium into the peritoneal cavity; and collecting round the ostium, and coagulating in layers, gradually expands into an encysted collection of stratified blood-clot with a fluid centre surrounding the tubal opening. Such a collection of blood is known as a peritubal hæmatocele. The more slowly the blood is poured out from the tube, the more definite is the resulting blood-tumour. But if the blood is poured out rapidly, it has no time to become encysted; and the hæmorrhage may be almost as free, and the symptoms may be as alarming, as in the case of tubal rupture.

If the tubal mole becomes detached it may be expelled also, presenting a typical tubal abortion; or, if it remain partially attached, slow bleeding will continue, and we have an instance of a missed tubal abortion. Some blood nearly always passes out through the uterine ostium of the tube into the uterine cavity, whence it is expelled; and at the same time the uterine decidua tends to break up. The clinical history we have presented here is, therefore, that a week or two after a missed period the patient has a little hæmorrhage, which she looks on as a delayed monthly period. But the hæmorrhage continues, perhaps, for weeks, never profuse, but scanty, dark, or perhaps a mere brownish discharge, intermixed with decidual fragments. There may be no pain at all, or there may be pain of varying severity, referred to one or other side. On examination a rather soft swelling is felt at the side of and usually a little behind the uterus. Perhaps the most important points as regards diagnosis are the scantiness of the bleeding, and its venous or brownish aspect. A free flow of bright blood is hardly ever found with tubal pregnancy.



Early tubal rupture or abortion, as I have described them, may occur at any time within the first six or eight weeks. But the ovum may survive these early dangers; the tube enlarges and expands the layers of the mesosalpinx till pregnancy has proceeded, it may be, to a term of three months, and during this time no symptoms may occur to show that anything is wrong. The patient probably believes herself pregnant; there may be some morning sickness, and mammary secretion may be present.

Later tubal rupture.—From about the eighth to the twelfth week the second critical period begins; for no tube can go much beyond this period without rupture. When rupture does take place, much will depend on its position and character; and we have thus two main types of rupture, the intra-peritoneal and the intra-ligamentary, according to the position in the circumference of the tube at which rupture takes place.

Later intra-peritoneal rupture.—If rupture occurs into the peritoneal cavity, the picture of the case has features in common with early tubal rupture and abortion; the difference is mainly one of degree, for in regard to the severity of the symptoms, late rupture is usually intermediate between abortion and early rupture. That is to say, the hæmorrhage is more profuse than it is with tubal abortion, and consequently the shock and collapse are greater; on the other hand, the hæmorrhage is not usually so terrific as it is with early rupture, and the collapse is not so sudden and complete as it is with that accident. The blood is seldom so well encapsuled as it is with abortion; but there is a greater tendency to encapsulation than we find with early rupture, where there is seldom time for any encapsulation to occur. One prominent symptom and one important physical sign are present in later rupture which are often absent in the earlier condition: the symptom is acute, sudden pain "as if something had given way inside," coincident with the faintness and collapse; the sign is a well-defined swelling produced by the large gravid tube. In the main, however, it will be seen that the clinical picture sufficiently resembles the previous ones; nor is there usually any difficulty in diagnosis, provided that the possibility of the condition be borne in mind.

Intra-ligamentary rupture.—As far as I am aware, intra-ligamentary rupture seldom, if ever, occurs

early; it is an accident specially characteristic of the period of gestation comprised in the eighth to the twelfth week. I may say at once that nearly all the difficulties of diagnosis are in connection with this form of rupture.

The sequence of events is as follows: the rupture into the broad ligament is signalled by sudden pain; and this is generally accompanied or rapidly followed by an attack of faintness which, however, falls short of the profound shock and collapse incidental to intra-peritoneal rupture. It not infrequently comes on immediately after some special exertion; but on the other hand, the patient may be lying quietly in bed at the time. Very soon there is a little hæmorrhage from the uterus, what the patient calls a "show." She probably goes to bed, and after a day or two may feel better and get up again; then she may have another attack. Not infrequently these attacks are accompanied by vomiting, and the patient and her friends suppose that she has a bilious attack. Two important symptoms persist, namely, pain in the side and a slight discharge of blood, dark or brownish. This state of things may go on for months; the patient feels ill, is frequently in bed, and occasionally has a slight rise of temperature.

On examination the uterus is slightly enlarged, but the enlargement does not in any way correspond to the supposed term of pregnancy, and on one side of the uterus a swelling is distinctly felt, the size of a fist or larger; it is rather fixed and appears to be in the broad ligament. It is actually due to distension of the broad ligament by the gestation sac and by blood. With every fresh accession of hæmorrhage the swelling increases. The uterine hæmorrhage is due principally to disintegration of the uterine decidua, but occasionally there is some influx of blood from the tube into the uterus, which contributes to the external hæmorrhage.

The conditions for which a ruptured tubal pregnancy at three months may be mistaken are:

Abortion; retroversion of the gravid uterus; pyosalpinx; ovarian tumour; pelvic cellulitis.

The diagnosis between tubal pregnancy and abortion is not always easy. The term of amenorrhœa followed by abdominal pain and hæmorrhage may quite well point to threatened abortion; and when the swelling in the broad ligament lies close to the side of the uterus, it may be difficult,

even on making a bimanual examination, to decide whether the swelling is intra- or extra-uterine. The two chief points which will serve to differentiate the two conditions are the situation of the pain and the character of the blood. In tubal pregnancy the pain is referred definitely to one side; in threatened abortion it is referred to the back and to the middle of the abdomen. In tubal pregnancy the discharge is scanty, dark red, and brownish, grumous; in abortion it is free, clotted, often bright red. Sometimes, as I have said, the swelling in cases of tubal pregnancy appears to be closely incorporated with the uterus; but much more often it can be readily recognised as a distinct swelling to the side of the uterus. If there be any difficulty about the examination, the patient should be placed under an anæsthetic; this will nearly always allow of the diagnosis being cleared up.

I have known of several instances of tubal pregnancy in which a patient has been kept under observation for some months, perhaps in bed, under the impression that she had had an incomplete miscarriage; and it has been fondly hoped that the remains of the ovum would be expelled and the hæmorrhage cease. Such hope has, of course, been doomed to disappointment; and in some cases an appreciation of the significance of the situation of the pain and the scanty brownish discharge, together with a careful bimanual examination, would have led to a correct diagnosis at a much earlier stage.

The gestation sac and the effused blood and clots in a case of tubal rupture may occupy a position behind the uterus, in the pouch of Douglas; the uterus then becomes pushed forward against the pubes and may lead to retention of urine.

Hence we have here what appears to be a typical instance of an incarcerated and retroverted gravid uterus at the third month. In two cases of this kind I diagnosed retroversion of the gravid uterus, and tried to push up what I thought was the fundus, first in the out-patient room, and then under an anæsthetic. Needless to say, the attempt was unsuccessful, because a gestation sac in the pouch of Douglas rapidly contracts adhesions and becomes fixed. In another case I made the opposite mistake: I pushed up the fundus of the gravid uterus, and thought I had to do with a gravid tube;

because after reposition the fundus lay over to the left, separated from the rest of the uterus by a marked constriction; and there had been a history of slight hæmorrhage and of left-sided pain. After a fortnight the uterus resumed its normal shape, and the correct diagnosis was then arrived at. At that time I did not appreciate the fact that a tubal gestation sac would be fixed, and would refuse to be lifted up into the abdomen—hence my mistake. In a few cases similar mistakes have been reported in the practice of others. The diagnostic points that would help one to a correct conclusion are as follows: Given a history of pregnancy and of retention of urine, and the presence of a boggy swelling behind the cervix in the pouch of Douglas, then a history of lateral pain and of brownish discharge, dating from an attack of faintness, and fixation of the swelling in the pelvis, will lead to a diagnosis of extra-uterine pregnancy; and careful vaginal examination will bring out another important diagnostic point, viz. the doughy or boggy feeling of a hæmatocele as contrasted with the tense elastic feeling of a retroverted gravid fundus. If pain were absent and there were no hæmorrhage, or if there was rather free bleeding of a bright red colour, and the retro-uterine swelling were mobile and could be pushed up into the abdomen, we might safely diagnose the case as one of retroversion of the gravid uterus.

It is often very difficult to distinguish between a tubal pregnancy and pyosalpinx. The physical signs are often identical, and consequently we have nothing but the history to guide us.

In both conditions we have lateral pain; in tubal pregnancy it is unilateral; in pyosalpinx it is commonly bilateral, but if one side be much less affected than the other, pain may be complained of chiefly on one side. In both conditions we have irregular hæmorrhage; in tubal pregnancy it generally follows one or two missed periods, and when it comes on it is scanty and is not restricted to the monthly periods. But the hæmorrhage of tubal pregnancy may come on without previous amenorrhœa and it may be chiefly observed at monthly intervals. Pyosalpinx is usually associated with menorrhagia, but it sometimes causes a scanty brownish discharge in the intervals of menstruation closely resembling the discharge that we have come to regard as so characteristic of extra-uterine pregnancy. I have several times operated on a case of

pyosalpinx under the impression that I might find a tubal pregnancy. The diagnostic points which will help us to distinguish between the two conditions are as follows:

A term of amenorrhœa followed by irregular, scanty bleeding, with one-sided pain, in a case where there is no history of gonorrhœa, and the presence of a well-defined swelling limited to one side, with a healthy tube on the other side, will properly be diagnosed as tubal pregnancy. If, on the other hand, the menstrual loss has become abundant in a patient with a history of gonorrhœa, if there has been no amenorrhœa, and pain, though more marked on one side, is present on both sides, and if with a well-marked swelling on one side, there is evidence of thickening on both sides, the case is more likely to be one of pyosalpinx. But naturally, it is not in the typical cases that difficulty arises; it is in the non-typical cases, which present something of the characteristics of both conditions; and there are instances where an incorrect diagnosis, based on a careful investigation of the case, is more creditable than a correct diagnosis made haphazard or in opposition to the probabilities of the case.

As a rule the symptoms and signs of an ovarian tumour are sufficiently definite to prevent such a case being diagnosed as an extra-uterine pregnancy. Nevertheless, this has happened on several occasions. I have seen two cases which I thought were probably extra-uterine pregnancy, though the symptoms were not quite typical. In both a period of amenorrhœa was followed by uterine hæmorrhage, and a well-defined swelling was felt by the side of the uterus. One proved to be a solid tumour of the ovary, a carcinoma, and the other was an ovarian cyst. You will have gathered what great importance I now attach to a scanty brownish discharge as an indication of extra-uterine pregnancy; and had I realised this at the time, I should not have made a wrong diagnosis in these two cases, for in both of them the discharge of blood was rather free and bright. Yet the amenorrhœa made the diagnosis of extra-uterine pregnancy very tempting. In a third, and quite recent case there was a short term of amenorrhœa succeeded by scanty, irregular hæmorrhage, and the patient complained of considerable pain in the left side. A well-marked swelling to the left of the uterus completed the picture of tubal pregnancy; yet operation revealed an early intra-

uterine pregnancy with a small ovarian cyst into which hæmorrhage had taken place.

I have not met with an instance in which an extra-uterine pregnancy was mistaken for an ovarian cyst, but such a mistake is conceivable.

The last condition I have to mention as requiring to be diagnosed from extra-uterine pregnancy is pelvic cellulitis. I met with one case some years ago in which a patient was supposed to have caught cold at a monthly period. The temperature ranged about 103° F., and on examination the left broad ligament of one side was greatly distended and hard, presenting the board-like induration so characteristic of pelvic cellulitis. I had her taken into hospital; but she was considered, both by my colleagues and by myself, to be too ill for operation, and she died with symptoms of intestinal obstruction. At the autopsy the rectum was compressed by a swelling of the broad ligament which proved to be a four months' gestation sac. In that case there was no history of amenorrhœa, nor was there any discharge of blood from the uterus, so that the difficulty of diagnosis was very great.

Abdominal pregnancy.—We may now go back to our supposed case of extra-uterine pregnancy, and consider some other possibilities that lie before it. When a tube ruptures, either towards the peritoneal cavity or towards the broad ligament, the child's chance of life is not yet over; for, provided that the placental attachment to the tube is not unduly disturbed, the child may go on growing. Under these circumstances, if the rupture has been towards the peritoneal cavity, the foetus in its amniotic covering becomes extruded through the rent in the wall of the tube, and comes to lie among the intestinal contents, to which the amnion contracts adhesions. This is known as an abdominal pregnancy.

This accident may have caused little or no disturbance, and pregnancy proceeds to term, no suspicion having been aroused, in all probability, as to the extra-uterine position of the foetus. I shall return presently to a consideration of the symptoms and diagnosis of extra-uterine pregnancy at term.

Intra-ligamentary pregnancy.—If rupture has occurred into the broad ligament, and the placental attachments in the tube remain comparatively uninjured, development may proceed for some time; this is what is called an intra-ligamentary or mesometric gestation. There is, of course, less scope

for the growth of the foetus in the broad ligament than there is in the peritoneal cavity; nevertheless pregnancy may apparently even under these circumstances proceed to term. I say "apparently," because a certain number of cases in which pregnancy at term was thought to be mesometric have been shown to have been, in all probability, really abdominal.

Secondary intra-peritoneal rupture.—In most cases, however, the tissues of the broad ligament will not stretch sufficiently to allow of uninterrupted development; at one place there is a thinning out of tissues, and then a secondary rupture occurs, this time into the peritoneal cavity.

The symptoms in this case are very similar to those we have described under the heading of Later Intra-peritoneal Rupture; there is sharp pain followed by marked collapse and symptoms of intra-peritoneal hæmorrhage; and there may be also a little hæmorrhage from the uterus. The symptoms are not quite so terribly sudden as in the earliest form of intra-peritoneal rupture; but the accident is usually graver than in a rupture at the third month, and there is even less likelihood of spontaneous recovery.

The clinical picture of such a case is usually as follows: The patient believes herself to be four or five months pregnant; she has appeared to be in normal health, and perhaps as the sequel to some comparatively slight over-exertion she is seized with an attack of pain and faintness, for which she probably goes to bed. She notices a show, and thinks she is in for a miscarriage. She may, perhaps, rally somewhat, but another attack of faintness comes on, worse than before. The bleeding from the uterus is, however, very slight, and evidently is quite inadequate to account for her serious condition. On careful inquiry it can be elicited that some six or eight weeks previously she had a slighter attack of pain and faintness, also accompanied by a show. The explanation is that this first attack corresponded to a rupture into the broad ligament, the pregnancy not being interrupted; and that the second and severe attack is due to a rupture from the broad ligament into the peritoneal cavity. On examination, a swelling the size of a foetal head can probably be felt to one side and behind the uterus; and if intra-peritoneal hæmorrhage has been going on for a little while, there may be dulness in the flanks and above the pubes. The patient will pre-

sent the signs of severe hæmorrhage—collapse, pallor, coldness, sighing respiration, and a very rapid, thready pulse. Under these circumstances there is not a minute to be lost. The abdomen must be opened, the gestation sac removed, and the bleeding point secured.

Extra-uterine pregnancy at term.—Lastly we have to consider the features presented by an extra-uterine pregnancy at term. Labour pains come on, and may continue at intervals for several days. In virtue of some kind of cell-memory, perhaps inherited, the uterus contracts and opens up its cervical canal, not because it has anything to expel, but because tradition teaches it that this is the proper thing to do at the end of the ninth month of pregnancy. It does it, however, with a lack of conviction; the pains are only a poor imitation of real labour pains, and dilatation does not proceed far. It would be difficult to find a more typical or a more pitiful instance of misdirected energy, and of efforts predestined to failure. For, of course, no progress is made. On examination, the cervix will give some indications of the abnormal condition: it will be found to be smaller than usual, and on introducing the finger through the internal os, as is generally possible, the uterine cavity is found to be empty. The first case of extra-uterine pregnancy that I was personally concerned with was of this kind; the patient was admitted to the General Lying-in Hospital when I was a house physician, and I well remember my surprise when I passed a finger into the uterus and found it empty.

Another feature which may help the diagnosis is the distinctness with which the outlines of the foetus can often be made out through the abdominal wall.

Supposing that no surgical intervention is resorted to, the pains disappear, placental circulation ceases, and the child dies. The liquid amnii becomes absorbed, the abdominal distension subsides, and the breasts discontinue their secretion.

Sometimes the foetus and placenta suppurate, and after many days are discharged in fragments through the rectum or bladder, or through an opening in the abdominal wall. If no such affection occurs the destiny of the foetus is to be converted into adipocere, or transformed, by calcification, into a lithopædion, and in this atrophied state it may lie "perdu" for many

years, while more fortunate brothers and sisters arise and pass into the light of day by the conventional intra-uterine route. It may, indeed, remain successfully dormant until the mother has passed the child-bearing age, and even until the end of her life, and may astonish some antiquarian some centuries later when he finds a curious stone with traces of infantile lineaments lying in a coffin beside a presumably female skeleton.

It is clear, from the foregoing brief sketch, that the life of an extra-uterine foetus is one full of vicissitudes and of extraordinary risks, which extend beyond its own fragile existence and involve the mother in deadly peril. The consideration of these risks has led thoughtful men to the conclusion that a case diagnosed as an extra-uterine pregnancy should be submitted to operative treatment as soon as possible. There is no doubt that many lives have been saved by the adoption of this principle.

An Internal Disinfectant in Phthisis and other Severe Infectious Diseases.—Dr. Konrad Küster is "privy councillor of the public health" (Geh. Sanitätsrath) at Berlin. He proclaims that a remedy has been found which promptly and energetically destroys bacilli while, even taken internally in large doses, it has no injurious action on the human organism. The remedy in question is a meta-iodo-ortho-oxy-chinolin-ana-sulphonic acid combination manufactured by the German chemists under the name of loretin and offered as a substitute for iodoform. Physicians were weary of new drugs and paid little attention to the announcements of Professor Claus of Freiburg in regard to the surprising bactericidal powers of the proposed substitute for iodoform. A Freiburg layman, however, saw some of these notices and tested the drug on himself. He gave it to advanced consumptives, and after a few months their friends were amazed at the improvement. The results in scarlet fever and diphtheria were equally striking, and the layman published a pamphlet on the subject, which attracted no attention. He then presented his data to medical circles, where he finally obtained a hearing. Küster was one of those who have been testing the drug extensively, and he waxes enthusiastic over its efficacy in infectious diseases, even the severest. The drug is eliminated apparently unmodified by the intestines, kidneys, lungs and mucosæ, thus following the bacilli into their favourite haunts. He is thoroughly convinced that in "griserin"—as the drug has been renamed—a remedy has been found which will place internal medicine on a par with triumphant surgery. The Birkenweder sanatorium has set aside an entire department, in charge of Küster, for patients taking the new remedy.—*Journ. A.M.A.*, vol. xliii, No. 22.

CONGENITAL DISLOCATION OF THE HIP JOINT AND ITS MODERN TREATMENT.

By J. JACKSON CLARKE, M.B.Lond., F.R.C.S.,

Surgeon to the North-West London Hospital and to the City of London Orthopædic Hospital.

DURING the past two years experience has been gained in this country of the results of the plan of treatment demonstrated by Lorenz in Liverpool and London in January, 1903. The details of Lorenz's method have been fairly fully described elsewhere,* and in the present place I propose to deal chiefly with the results and the after-treatment. By the greater number of medical men congenital dislocation of the hip joint is still regarded as an incurable affection, and to state the contrary, namely, that an average case is curable, may appear to be a somewhat daring assertion, but from my own experience I can unhesitatingly make it. On January 14th, 1903, Lorenz operated on a patient of mine, a girl æt. nearly six years, with typical double congenital dislocation. The after-treatment has been carried out under my own direction. That child is now cured, having the heads of both femora in the acetabula, and she walks strongly and well. This patient's mother, at certain stages of the after-treatment, was, as anyone without experience in the matter might be, disappointed at the result of the operation; but now that disappointment has given place to a deep satisfaction which she has demonstrated in the most practical way by sending to me one of her friends to seek the same treatment for her son who has a typical unilateral displacement. Several other cases that I have operated on since Lorenz's visit promise to be equally satisfactory. At the period of treatment that follows the removal of the first retention apparatus those patients who have had a unilateral dislocation successfully reduced have the appearance shown in Fig. 1, which is from a photograph of the patient that I showed at the meeting of the Clinical Society of London on October 28th, 1904. At this stage the limb in favourable cases presents a certain degree of rigidity which gradu-

* E.g. by the writer in 'The Practitioner,' March, 1903.

ally passes off with use. The attitude closely resembles that seen in traumatic dislocation into the thyroid foramen, as shown in Fig. 2, taken from an illustration given by Gross* (Nancy).



FIG. 1.—A girl *æ*t. 7 years after successful reduction of congenital dislocation of the right hip—after removal of the retention apparatus.

Indeed, the alteration of the position of the head of the femur is similar in the two cases—a downward and forward displacement. But how different in the two conditions is the anatomical structure of the new bed in which the femoral head rests! In the thyroid dislocation it rests among muscular and fibrous tissue and on bone, and an increasing stiffness results; after Lorenz's operation it rests on articular tissues, and the stiffness is a diminishing one.

Good skiagraphs, such as those shown in Figs. 3, 4 and 5,† are important in the study of the

* *Rev. d'Orthopédie*, May, 1904.

† Figs. 4 and 5 are taken from the patient shown in Fig. 1.

anatomical conditions before operation as a basis for prognosis, and after operation they are a necessary aid in demonstrating the result, though those experienced in the operation may dispense with them for the latter purpose.

It is not merely an operation but a plan of treatment that has to be considered; for, though the most favourable cases can be left to themselves from four to six weeks after the first retentive apparatus has been removed, and the majority of the patients do well with such care as their mothers can give them, the functional perfection of the limb is more rapidly restored by skilled supervision for longer periods—for a year, or even two. This is not surprising when we reflect that in an average case of congenital hip dislocation the acetabulum is small, and the head of the femur slightly altered in form, so that the cases cannot be compared to reductions of dislocated normal joints, but in addition a new impulse

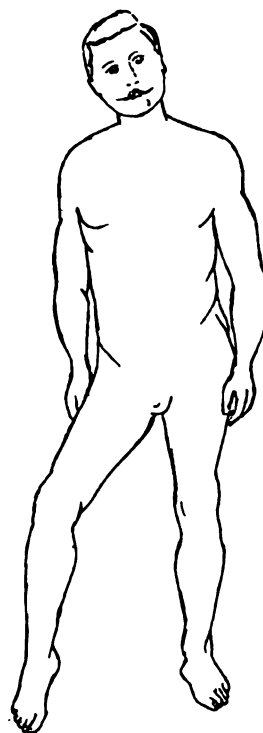


FIG. 2.—A man with unreduced traumatic thyroid dislocation of the right hip.

to development of the acetabulum and other parts has to be induced by the restoration of function to them.

It must not be thought that the patients are

invalids all this time : in unilateral cases they are confined to bed for a few days only and in bilateral cases for two weeks ; after this time they are encouraged to walk or to push themselves on a wheeled stool and regular exercises are done.

The operative part of Lorenz's treatment was done by myself in this country for some years before he showed us his methods in detail ; thus in 1899 I recorded* a case of double dislocation which I treated in this way. From the description I gather that I actually reduced the dislocation, but from a photograph that I have of the patient after the application of the plaster of Paris bandages it is

of the treatment, but that its aims and principle are right I have been convinced since I dissected an example of congenital dislocation of the hip ten years ago. Indeed, the experience of numerous cases that I have treated during the past two years has convinced me that only by adhering closely to every detail that Lorenz has described is danger to be avoided and success obtained. By this I would not be thought to imply that any fixed routine of procedure is to be followed ; on the contrary, every case is to be studied individually and treated on its own merits.

As to the dangers of the operation, they are due



FIG. 3.—Skiagraph of unilateral congenital dislocation of the right hip.

evident that the position of the limbs was incorrect. It is, I think, impossible for any surgeon who has not worked with Lorenz, or with someone who has learned directly from him the correct method of carrying out his manipulative operation, to perform the operation and subsequent fixation and after-treatment properly, and hence any conclusions based on operations done merely from verbal or written descriptions are to be disregarded, even though they may have been expressed with some semblance of authority.

It is not in the natural order of things that no further improvements will be made in the details

either to too much being attempted, or to inexperience on the part of the operator. If a patient approaches the age limit, about eight years for double dislocation or about ten years in simple dislocations, the danger of too extensive laceration of muscles or injury to bones can be entirely removed by a course of preliminary treatment ; *i.e.* the adductor ridge and the tensor fasciæ femoris may be freely divided either subcutaneously or through an open incision, the legs kept fully abducted and, after some days, the manipulation for stretching the muscles practised daily for a week or two before the operation, which will then be found to be an easy matter in practised hands—and it is only by

* CLINICAL JOURNAL, September 6th, 1899.

practice that the right mode of manipulation in the operation can be learned. It may be asked why this preparative treatment should not be adopted in every case, in order to diminish the gravity of the actual operation. To this it may be answered that a certain amount of reaction that is set up by stretching resistant muscles and ligaments, and by tension between the replaced head of the femur and the previously empty acetabulum is required for the making of a firm new joint. Another question is whether the heavy plaster of Paris apparatus that takes so long to apply

Some rumours have reached me of suppuration following Lorenz's manipulative operation. This is a most unlikely disaster if the following precautions are taken: first, to prepare the patient's skin and the surgeon's hands as if for an open operation; second, in performing the percutaneous myorrhesis to use the fleshy palmar aspect of the inner border of the hand, and not its bony dorsal aspect (in this way the skin escapes being bruised, though the tense muscular fibres give way); third, if any cracks appear in the skin, to sponge them with 1 in 40 carbolic and put on a dress-



FIG. 4.—Skiagraph of a limb after reduction of a congenital dislocation of the right hip, the limb being in the primary position.

and, it may be added, requires some skill and much practice to apply properly, might not be replaced by some simple retentive apparatus. My own experience of such appliances is not satisfactory. I have known a bed sore to be caused, and the apparatus requires readjustment at times, and this necessitates alterations in the relative position of the bones and interferes with the stability of the joint when the instruments are removed. I have also heard of bed-sores occurring after the application of a plaster case, but no such untoward result will occur if the bandages are applied according to Lorenz's teaching, and if the nurse has had experience of similar cases.

ing of cyanide gauze before the bandages are applied.

Before passing to discuss the leading features of the clinical course after operation, the after-treatment, and results, a word may be said as to the term "manipulative" that I have used instead of the term "bloodless" that is generally employed. After the altogether unequalled experience that Lorenz had of the open operation, I am sure that he is no more afraid of the sight of blood than any other modern surgeon, and that it was solely because his manipulative method gave him better results that he gave up the other. Again, since some blood is shed into the tissues

during the operation, and because when the adductors are unusually resistant it is sometimes wise to divide them subcutaneously with a tenotome, a proceeding which does not interfere with the results of the operation, the term "manipulative" is more correct. The facts of the present position of the open operation may be summed up as follows: *It should not be performed in any case in which manipulative reposition is impossible, and where the latter can be done it is safer, and alone gives far better functional results than the open*

not uncommon, and generally pass off in from one to three days. If cases are properly selected and a preparatory course carried out when indicated and the patients are thoroughly prepared for the anæsthetic, but slight shock is observed. If the operation has been prolonged and the pulse is rapid and weak, brandy or strychnine may be required as after any long anæsthesia.

The temperature may rise to 100°; any rise beyond this is probably due to constipation or retention of urine: the latter is uncommon, micturi-



FIG. 5.—Skiagraph of a successfully reduced right congenital dislocation with the limb in the position shown in Fig. 1.

operation. Therefore the open operation is no longer a legitimate surgical procedure.

Care of patient and course of events immediately after operation.—The patient is put in a well-warmed bed with one or two hot bottles near but not in contact with the legs. A pillow placed beneath the hips often relieves the patient. The feet are examined to make sure that the circulation is good; if there is marked cyanosis, coldness, or other evidence of blood stasis, the plaster cast and bandages must be cut at the groin or removed, to be reapplied later with diminished abduction and hyperextension. Slight interference with the venous return and slight swelling of the limb are

tion being, as a rule, increased in frequency for the first day or two. The child may be held in the sitting position to facilitate the action of bowel and bladder.

Pain.—If the plaster cast has been properly applied with extra pads of wool above the anterior superior iliac spines and the internal condyles of the femur, and the edges of the cast properly cut and everted a little where they lie over the inner condyles, the pain that follows the operation will be caused by several factors: 1st, effusion of blood from the torn adductors; * 2nd, pressure of the

* This effusion is reduced to a very small amount when the adductors are cut subcutaneously; the blood and serum

head of the femur against the acetabulum ; 3rd, the tension of muscles and of the anterior part of the capsule ; and, 4th, stretching of the skin over Scarpa's triangle. All these factors may be reduced to a minimum by preliminary preparation of the patient, but, as has been explained above, the first three are desirable within certain limits. The more prominent pains are due to the second cause and are, like those of hip disease, intermittent, and experienced chiefly at night, causing the patient to wake with a start. In older children they may be reduced by opiates, but these are, as a rule, unnecessary. After the second night the starting pains rapidly diminish.

The local swelling over Scarpa's triangle, due to effusion of blood, increases for twenty-four hours, and after this for the next twenty-four hours an additional soft œdema may be observed, causing sometimes considerable swelling of the labia or scrotum, and in difficult cases there may be some swelling of the legs. If the latter persists in spite of bandaging over cotton-wool, the plaster case must be opened along the front, and the spica of the underlying calico bandage cut at the groins. When the swelling has subsided, the integrity of the case can easily be restored by the superposition of a few plaster bandages. During the first few hours the nurse's hand should chafe the skin over the sacrum frequently, and on the following two or three days she must carefully prevent any wetting of the cast, and as soon as the tenderness in the groins has disappeared daily rubbings with the rubbing bands should be carried out, a little violet powder being dusted on them. In this way irritation and eczema will be prevented. If from any cause a sensitive area should develop under the cast, a hole can be cut in the latter, and the skin examined and treated. In unilateral cases walking may be commenced any time after the first week, and in bilateral cases the patient may sit on a padded box or stool, after about the tenth day, and may be taught to stand with the aid of a chair or table.

After-treatment.—Massage and exercises should begin as soon as the swelling has subsided by kneading all the accessible muscles beneath the

cast. For this, the patient should lie on a table, on the back for the massage of the anterior, and face down for that of the posterior muscles. The kneading should be carried out without undue chafing of the skin, and should at first be very gentle. The muscles of the foot and calf should also be kneaded daily.

Stretching the hamstrings.—As mentioned in my previous article, one of the marks of a successful reposition is that the knee is flexed, and extension is resisted by the tense hamstrings. It is absolutely necessary that this tension of the hamstrings be overcome by daily exercises before the first plaster is removed. This task is greatly facilitated if at the completion of the first operation they are thoroughly stretched whilst the patient is still under anæsthesia. If the operation has been difficult, and the tension of the hamstrings is very great, this proceeding should be deferred for a week or longer, when a second anæsthetic may be given, so that they may be thoroughly stretched. After the first forcible stretching under anæsthesia, the nurse should perform passive extension at the knee (12 to 20 swinging movements) regularly twice daily, and after a time these can be supplemented by active exercises on the part of the patient, till the latter in bilateral cases can voluntarily assume the posture known as the "split" in spectacular gymnastics.

Walking exercises.—As soon as pain and any fever there may be have subsided (from six to ten days) the patient should be placed on the feet and exercised in standing. In unilateral cases patients can walk unassisted after two weeks. The gait is peculiar, owing to the limb that has been operated on being fixed, so that the knee is behind the frontal plane. In taking off with the foot the body is propelled by extension of the knee and ankle. To facilitate standing and walking, the boot of the operated side must be raised from 1 to 5 inches, according to the height of the patient. The thickening must diminish from heel to toe. No stick or crutch should be used, but the patients should be taught to rely on their own efforts ; the use of the limb maintains its nutrition and assists in deepening the acetabulum. In bilateral cases the patients may be taught to hop sideways with the help of a single stick ; they can also be made to propel themselves to either side, or forwards and backwards, on a cushioned box provided with wheels. In both

escaping through the puncture made by the tenotome are absorbed by an antiseptic dressing.

single and double cases it is most important to encourage the patients to be on their feet as much as possible.

The most anxious period of the after-treatment is when the plaster case is removed, at the end of from six to eight months. The first task is to cleanse the skin, whilst avoiding the risk of displacing the head of the femur by maintaining the limb in the same position that it had when in the plaster case. If the rubbing-bands have been regularly used, the skin will be in good condition, and a light inunction of cold cream containing a

internal to the acetabulum on the horizontal branch of the pubes, pubic position. These two groups may be termed the normal results.

Abnormal results due to unfavourable anatomical conditions or imperfections of method in operation fall into three groups:

Group 3. *The head of the femur is above the acetabulum, under the anterior superior iliac spine. Sub-spinal position.* Want of experience on the part of the operator or his assistant is the chief cause of this result, but it may be produced intentionally in older patients, in whom it would be dangerous to



FIG. 6.—Stretching the hamstrings in a case of double dislocation after operation.

little zinc oxide applied first to the anterior and then to the posterior aspect of the body, and wiped off with a soft gauze swab, will be all that is required the first day, and after that the ordinary toilette of the nursery may be used. When the first plaster case is removed the position of the head of the femur must be critically examined. Any of the following conditions may be found:

Group 1. *The head of the femur is in the acetabulum. Normal position.* Three varieties may be distinguished: (a) the head of the femur is firm in its new position; (b) it is easily re-dislocated; (c) it is abnormally rigid.

Group 2. *The head of the femur is in front of and*

attempt complete reposition. This group gives good functional results if properly followed up by after-treatment.

Group 4. *The head of the femur is on the ilium either (a) above, or (b) behind the acetabulum:—* Relaxation, due to faulty technique. In group (a) a certain amount of permanent improvement is observed if the after-treatment is well carried out; the other group (b) are failures, and call for a new operation if the age of the patient and the anatomical condition offer a fair chance of success.

Group 5. One other result may be observed: *the great trochanter may lie in the acetabulum.* This is a very rare event, and arises from insufficient

stretching of the muscles during operation, or it may be intentionally produced in older patients, in whom the complete operation is impossible.

In cases of double dislocation one joint is often anatomically different from its fellow, and therefore the results on the two sides sometimes differ; thus both femoral heads may be securely replaced, or one only is secure, whilst the other is either insecure or in one of the positions 3, 4, or 5, or again, both may be in one of the latter positions.

Measures to be taken in order to prevent re-

to one and a half inches in order to prevent too rapid adduction of the corrected limb. The elevation can be gradually diminished to one half the original amount, which should be retained for from six to nine months.

In order to prevent re-dislocation during the night the limb or limbs must, except in very rigid cases, be placed in the primary position and maintained in it by a light moulded or other apparatus. Where there is much resistance to diminution of the primary abduction the knees may be bound together by



FIG. 7.—Position of patient for doing exercises in the frontal plane on a table. The nurse holds the pelvis firm whilst the patient practises abduction and adduction of the limb. The same exercises are done in the prone and, later, in the standing position.

dislocation.—After the first plaster-case is removed the patient misses its support, but in the great majority of cases, after a few days with massage and exercising, the child can voluntarily reduce the abduction by one half, and walks readily in this position, and in unilateral cases it is a noteworthy result of reposition that in walking the body rises on the corrected limb instead of dropping; *i.e.* the limb that was the shorter is made actually as long as, and virtually longer than the sound limb by the operation. The new position of the limb requires altered arrangement of the boots; that of the sound side must be raised from three quarters

an adducting band. In Group 1 (*b*) the laxity is due to insufficient retraction of the pelvi-trochanteric muscles, and calls for re-fixation, with slightly diminished abduction, about 75° .

Group 1 (*c*).—When, after the usual massage, etc., the reduced joint remains stiff, an anæsthetic may be administered in order to see whether the stiffness is due to muscular tension, as is commonly the case, or to adhesions in the hip joint. The presence of such adhesions may be inferred when attempted passive movements at the joint are painful. After carefully moving the joint under an anæsthetic such a joint may be treated either

by a weight extension in bed or by a secondary fixation apparatus; in either case the limb may be brought to 45° of abduction, and as soon as the sensitive condition has subsided the ordinary exercises (see below) may be begun.*

Group 2. *The pubic position*.—The head of the bone projects in front of the thigh. It is really only a variant of the normal position. This position may be produced intentionally in order to compensate for an unusually shallow acetabulum by obtaining a greater degree of shrinking of the pelvi-trochanteric muscles. Or it may be due to excessive stretching of the front of the capsule. In either case it is readily corrected by inward rotation of the femur. In order to render the correction permanent the limb is fixed in this position, a second plaster case being applied under anæsthesia with reduced abduction and with a varying degree of internal rotation. This secondary fixation apparatus must be worn from two to six months—*i.e.* until the head is firm in the acetabulum, when the ordinary exercises are carried out.

Group 3. *The sub-spinal position*.—The head of the femur is above the acetabulum. The limb is shortened and the stability of the joint is diminished; but improves under careful after-treatment, which is carried out on the same general plan as in ordinary cases; but special attention must be paid to massage of the glutei and full abduction with extension must be obtained during the exercises and kept up at night during the period of after-treatment. This position will rarely occur with experienced operators.

Ordinary exercises to be used after removal of the first retention apparatus.—The patient lying on the back on a table, the pelvis square, (1) the muscles in front of Scarpa's triangle, the upper part of the adductors and the muscles and the legs are well kneaded, then resisted knee-flexion and extension are done; (2) patient, lying on sound side (in a unilateral case), legs parallel (*i.e.* pelvis tilted), the gluteal muscles are well massaged; patient raises operated limb to vertical position, bringing pelvis square with the trunk (this requires assistance at first); (3) patient, lying prone, posterior muscles are massaged; patient elevates both lower extremities by hyper-extension of spine and thigh; (4) standing, supported by table; patient raises the limbs alternately in the frontal plane to above the horizontal position.

* A very full account of these exercises is given by Ashley and Müller in the 'New York and Philadelphia Medical Journal,' April to September, 1904.

BOURNEMOUTH AS A HEALTH RESORT.

THE climate of Bournemouth has been truly described as one of the mildest in Great Britain; the average mean temperature in winter is 42° F., and even if the two coldest months are taken, *viz.* January and February, the mean temperature works out near 40° F. The equable climate found at Bournemouth renders it a very pleasant place to visit in the summer, for the same factors that make it an ideal spot for a winter sojourn give its climate in summer an acceptable degree of coolness. This favoured site, therefore, can be safely recommended to patients during summer months, and the medical man may assure invalids that they will be braced up by the tonic effect of the sea breezes without any fear of excessive heat. The natural configuration of the country affords shelter from the north, north-east, and east, and this protection from the cold winds is assisted by the pine-woods which cover large areas of the surrounding districts. The town lies open to the south and to the west. The rainfall is moderate; the number of rainy days in the year has been found to be 150, and there is a medium degree of atmospheric humidity. The dry, sandy soil is naturally very absorbent of any rain that falls, so that there is a rapid disappearance of water from the surface, ensuring a corresponding degree of dryness in the atmosphere. To put the whole case in a very few words, all that need be said is that the rainfall at Bournemouth is less than thirty inches in the whole course of the year, and the soil, composed of sand and sandstone, carries away the water with great readiness. It is therefore not to be wondered at that this healthy resort, built mostly on the pine-clad slopes by the Bourne Brook on the dry sandy soil just described, should specially appeal to medical men desirous of finding a suitable place for patients suffering from bronchial and pulmonary affections and for invalids convalescing from debilitating diseases. Bournemouth is only two hours and six minutes' railway journey from Waterloo, and is excellently served in regard to hotels, the Royal Bath Hotel in particular, with its moderate charges and splendid accommodation, well deserving the reputation it has gained.

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A LECTURE

ON

EXPLORATORY LAPAROTOMY, ESPECIALLY IN CASES OF MALIGNANT DISEASE.

Delivered at St. Bartholomew's Hospital.

By C. B. LOCKWOOD, F.R.C.S.,

Surgeon to the Hospital.

GENTLEMEN,—Inasmuch as you will often have to consider the advisability of abdominal exploration I propose to place before you some of the considerations which determine the decision.

I myself perform exploratory laparotomy with reluctance. The term "exploratory laparotomy" should tell you why. An explorer does not go into regions which are known, but into those which are not; he goes to make discoveries. Now, for an operation to be an assured success it ought to be preceded by a correct diagnosis. Then the operator has a definite objective, nothing is left to chance, and the ultimate result can be foreseen.

But an exploratory operation is done for the purpose of making the diagnosis, and usually in the further hope of that diagnosis allowing of an attempt to cure or palliate.

Let us consider for a moment the alternative in which exploratory operation has enabled a diagnosis to be made and has revealed the presence of malignant growth which cannot be removed. The abdomen is closed and the patient recovers from the immediate dangers of the operation. Now the moment has come when the result has to be told. It is very painful to have to tell anyone that life must inevitably be short. When all the blessings escaped from Pandora's fateful box the gods decreed that Hope should linger behind; and the hope which springs eternal leads many to submit to exploratory laparotomy in the hope that after all

a curable disease may be discovered. In a little while I shall tell you of instances in which that hope has been happily fulfilled. But supposing an inevitably fatal form of malignant disease is discovered, then you have to decide what to tell. Fortunately, the patient is usually endowed with courage and fortitude, and requests to be told the truth. At other times it would be manifestly improper to impart bad news. For instance, exploratory laparotomy was performed and a tumour, which had been seen and felt, was found to be in the liver, and had the microscopical characters of a cylindrical-celled carcinoma. Inasmuch as the patient became exceedingly ill, with a rapid pulse, I advised that she should not be told. The evil tidings were withheld for some days and only imparted when it had become clear that the concealment was an additional unhappiness. I am told that when at last she knew she became tranquil and resigned. This has made a deep impression upon my mind. At first it was right to withhold, but afterwards that ceased to be the wise and courageous course.

But so strange is the human mind that there are some who do not wish to know. Not long since an exploratory laparotomy revealed a carcinoma of the great omentum. The patient never asked what had been found, or what had been done, and although some ascitic fluid re-formed, and she became much emaciated, yet I am told that she never again alluded to her complaint. Her friends and relations were duly informed. Sometimes it is imperative to tell the patient what is the matter. Business affairs may have to be settled or property disposed of. But the question I have raised is not in reality a very hard one. Although the task is a very painful one to undertake, I am sure that in by far the greater number of instances the patient has a right to know, and ought to be told. Infinite gentleness and tact are needed. At the moment you understand the meaning of the stereotyped phrase: "the judge was visibly affected when he put on the black cap."

There is yet another issue to be faced when the exploratory operation has brought to light a malignant growth which cannot be taken away. Very likely the growth has begun to lessen the strength and vitality of the patient, who, not unnaturally, blames the operation when the weakness and prostration increase. Indeed, you need not be

surprised to hear that you are blamed for having done an unnecessary operation.

But against this gloomy picture must be set another. I explored the abdomen to ascertain the nature of a tumour beneath the upper part of the right rectus abdominis. For six months the patient had felt ill and lost flesh, but had merely a feeling of slight discomfort in the abdomen. Otherwise he had no symptoms to indicate disease of the stomach, liver, gall-bladder or intestines.

The tumour was in the pylorus and had invaded the liver. Some enlarged lymphatic glands were felt behind the lesser sac of the peritoneum. Six months after this operation the medical man under whose care he was wrote that, although very emaciated, he was not any worse off. He suffered no pain or discomfort and ate and slept well, and, in fact, generally was better than before the operation. Indeed, the patient had begun to doubt the correctness of the diagnosis. However, death took place three months after the letter was written—about nine months after the exploration. Such occurrences as these have made me very cautious how I venture to prognosticate the course which the malignant disease will pursue after an exploratory operation.

In another instance I was requested to perform exploratory laparotomy after unavailing attempts had been made to diagnose the cause of an accumulation of fluid—nearly always an ominous portent. When the fluid had escaped through the median incision a great quantity of malignant growth was found scattered throughout the whole abdomen. An especially large mass was felt behind the stomach and transverse meso-colon. The place of origin of this growth was never known. But I remember well declining to guess how long the patient would live, and it was perhaps as well that I did so. After the operation the fluid did not re-accumulate for many months and a comparatively active life was led. In the end death ensued two years after the exploration. In another case of very extensive irremovable malignant disease beginning in the ovary the patient lived for a year after an exploration. Perhaps both were exceptional in their tenacity of life. Probably not more than from three to six months elapse between the exploration and fatal ending when malignant disease is found in the great omentum or other parts of the peritoneum.

And this leads me to remark that malignant disease of the great omentum is not an unusual cause of ascites. Cancer of the great omentum is one of the deepest mysteries of a mysterious disease. It is remarkable, too, what masses of growth the abdomen may hold without their presence being revealed to the sense of touch. At times the masses are hidden by the fluid, but at others they rest upon the intestines as upon an air-cushion, so that they merely retreat when pressed upon. This was clearly seen during an operation in which great lumps of cancer were found in the omentum, but could not be felt until they had been supported by the fingers pushed behind them. At other times the mass is hidden by the inflated intestines or stomach.

In a proportion of cases exploration does good rather than harm, although nothing further can be done. The escape of the fluid relieves the heart and diaphragm. Indeed, the breathing and the circulation may be impeded to such an extent that the fluid must be got rid of. I advise that this be done by an incision rather than a puncture, for then a double end is gained: the fluid is evacuated and the disease diagnosed and possibly cured. For instance, a lady had been thrice tapped for ascites. I guessed that she might after all be suffering from papillomatous growths of the ovaries and advised that next time the fluid accumulated it should be removed by incision, so that this diagnosis might be verified. Each ovary was a mass of papilloma with long and thin pedicles. The patient was quite well four years after the operation.

Some might think that in cases of ascites incision is more dangerous than puncture; but this I am inclined to doubt. I have twice been called upon to stop alarming hæmorrhage after puncture, and once I have seen the hæmorrhage speedily fatal. Sometimes the fluid does not re-accumulate after laparotomy, or there is a long pause before its re-accumulation. I can recall several cases in which it has not been necessary to do anything further for the removal of the fluid. Some may have re-formed, but not enough to embarrass the heart or lungs.

Should exploratory laparotomy bring to light tuberculous peritonitis with fluid distention the prospects of recovery are hopeful. But when the tuberculous peritonitis is of the dry kind, with a very hard abdomen, an exploratory laparotomy may

do harm, and result in a faecal leak. That, I need hardly say, is a very grave addition to the miseries of the disease. The tuberculous leak is, I believe, incurable and shortens life. However, this kind of tuberculous peritonitis can as a rule be diagnosed without an exploration.

It is important that you should clearly realise that abdominal distention is one of the most serious complications of exploratory laparotomy. When the distention is due to fluid the dangers are usually least. The fluid can be got rid of and the heart and lungs relieved, and the intestines enabled to propel their gaseous and faecal contents. Gaseous distention of the intestines is more serious. The distention must be relieved. Sometimes this may be done by incisions into the bowels, which are sewn up again, at others by making an opening between the small intestine, the cæcum, or the sigmoid flexure and the outside of the body. The last is the best of these unpleasant expedients, for the contents of ileum and cæcum are so liquid that they cannot be properly controlled, and the patient's life becomes almost unbearable. No one would resort to these distasteful expedients if by any possibility they could be avoided.

When the abdomen is distended by a solid tumour, and when that solid tumour cannot be removed, a most dangerous condition is brought about. In all probability the heart, lungs, and intestines were much impeded before the operation, and after it is over the cause of their impediment still persists; and now the shock of the operation, the after-effects of the anæsthesia, and the injury to the abdominal wall, have been superadded. Last summer you may remember having seen me explore the abdomen of a young woman. It was distended by malignant tumours of both ovaries. In order to relieve the distention and prevent a speedy ending from intestinal obstruction, I deliberately removed the largest of the tumours. The hæmorrhage was, as I had foreseen, furious. However, it was controlled with clamps and gauze. The patient survived for nine weeks. I can recall another case in which the removal of a large malignant tumour of the ovary prolonged the patient's life for two years. An old lady had a very solid and immovable tumour filling the lower abdomen. When brought into view it looked malignant, and both Dr. Griffiths and I thought at first that it could not be removed.

However, I faced the risk and succeeded. Two years later a growth appeared in the ischio-rectal fossa, became infected from the rectum, and led to septicaemia.

Obviously we must proceed with extreme caution when confronted with solid abdominal tumours of a dubious nature. Remember, that when once the removal of the tumour has been begun it is safer to go on than to turn back. This is pre-eminently a moment when the qualities of the surgeon are revealed.

Let us now turn to the second alternative, that in which exploratory laparotomy is followed by a palliative operation. It would be easy to recall a number of instances of pyloric obstruction in which that most highly satisfactory operation gastro-enterostomy had brought about the most gratifying improvement. Pyloric obstruction of any kind is followed by wasting and loss of flesh, and the patient at last becomes so emaciated that cancer is supposed to be present. But happily obstruction of the pylorus is not infrequently brought about by other and less mortal diseases than cancer, especially by the contraction and cicatrization which follow inflammation and ulceration. It may be exceedingly difficult to infer the cause of the pyloric obstruction from the clinical data, and doubt may still remain when the pylorus has been seen and felt. Some carcinomata constrict the alimentary tract as if it had been tightly encircled and tied with string. Growths of this kind have to be sought for with the microscope, for they cannot be positively diagnosed with the unaided senses. They probably pursue an exceedingly slow course, and cause death by mechanically occluding the alimentary tract. If this result be obviated by gastro-enterostomy, or by intestinal anastomosis, life may be prolonged for a space of time to be measured by years rather than by months. Even when the exploratory laparotomy has revealed an obvious tumour of the pylorus the palliative gastro-enterostomy affords great relief, and not infrequently leads the patient to suppose that he is quite well. Further, as you are aware, the presence of a tumour which can be seen and felt is not proof positive of the presence of a tumour with malignant attributes. When I lectured to you upon the early microscopical diagnosis of tumours,* an instance was given in which I had mistaken an

inflammatory growth and thought that it was malignant. Provided a piece of the tumour can be excised, an immediate microscopical examination is the safeguard against such an error, and a freezing microtome and a microscope should form a part of the organisation of nearly all exploratory operations. The discovery of secondary growths in the liver or lymphatic glands, or the extension of the growth into tissues other than those in which it arose are also signs of deep significance. But, as you were told when I lectured upon growths in the urinary bladder, the muscular walls seem an obstacle to the extension of the malignant growth. So that, as a rule, those which begin within the stomach, intestine, gall-bladder, or urinary bladder, are slow in spreading.

This explains why I have seen a man in comparatively good health two years after I had performed gastro-enterostomy for a tumour which obstructed the pylorus, and why some who have had inguinal colotomy performed for carcinoma of the rectum live so long, and in reasonable comfort. Therefore, there is much to be said in favour of exploratory laparotomy when it is followed by a palliative operation such as gastro-enterostomy.

But after the palliative operation has been successfully achieved the future has to be faced. Should the disease be innocent, or should it be very slow in progress, then all is justified. But, obviously, such endings cannot be foretold.

At times an exploration reveals disease whose effects can be palliated for a time, but which must inevitably lead to a not far distant and painful ending. You may remember a young woman in Lucas Ward who had a tumour which could be felt in the right iliac fossa, and which was associated with some amount of intestinal obstruction. Unfortunately, when the tumour was exposed it had the naked-eye characters of colloid cancer of the end of the ileum, ileo-cæcal valve, cæcum, and right colon. In addition, the retro-peritoneal and pelvic lymphatic glands were greatly enlarged. Under these circumstances I anastomosed the hypertrophied ileum to the transverse colon. She made a speedy recovery and was for a time better, but at the end of the seventh month I was informed that she was very ill, and dying in pain and misery. Distressing cases such as this have led some to question the propriety of performing these palliative operations. But personally I shrink from the

* 'British Medical Journal,' July 2nd, 1904, p. 5.

responsibility of being judge and jury, and feel bound to do all that can be done to prolong life. Think of the alternative in this case. So far as could be foretold she was doomed to die within but a few weeks of intestinal obstruction—a truly horrible fate. After the operation she had at all events a period of comparative ease and comfort.

You must not infer that an intestinal anastomosis is necessary whenever an irremovable tumour of the intestine is encountered. An estimate has to be formed as to the chances of obstruction, and this requires considerable experience and judgment. The contents of the large intestine cannot be propelled through narrow channels, but those of the small intestine are so liquid that they pass through very small apertures. A lumen the size of a No. 10 catheter will suffice. For this reason I did not anastomose the small intestine of a young woman who had malignant growth upon the ileum and elsewhere, although the intestine looked much narrowed. I inquired afterwards whether intestinal obstruction had supervened, and was told that it had not.

Exploratory laparotomy has oftentimes to be performed to ascertain the cause of jaundice, and in this class the exploration may be followed up by a further proceeding which is either curative or palliative. It would be very sad to allow anyone to die of jaundice, caused by an impacted gall-stone. These can be extracted, and the cases, in spite of the jaundice, do exceedingly well. But when the jaundice is caused by malignant growth in the liver itself, or in the head of the pancreas, the outlook is forbidding in the extreme. But even here some relief can be afforded by establishing a biliary fistula between the gall-bladder and the exterior of the body, or by making a communication between the lumen of the gall-bladder and that of the intestine. I have tried both of these plans and am at present in favour of the formation of a fistula between the gall-bladder and the surface of the body. But, in spite of statistics served up for the credulous, I advise you to approach exploratory operations upon the deeply jaundiced with extreme circumspection, and after every other means of diagnosis has been exhausted. What would you think if one were to try and explain fatalities by such sillinesses as "failure of the heart," "delayed shock," and so forth? The children's phrase "died from want of breath" would be quite as felicitous.

Exploratory laparotomy has oftentimes the effect of assuaging the pain of malignant disease. Pain is a very variable feature. It may be wanting or it may be excruciating. It is difficult to account for its presence or absence. But I believe that it occurs when the growth is spreading into the parietal peritoneum. For instance, a patient had intense pain and tenderness beneath the upper end of the right rectus abdominis. At this spot a malignant tumour in the left lobe of the liver was found adherent to the abdominal wall by recent adhesions; these were undone and the pain ceased. Or again, a very painful and tender spot to the left of the umbilicus marked the place where a malignant tumour of the transverse colon was adhering to the parietal peritoneum. As is well known, the parietal peritoneum is well supplied with sensory nerves, and is a very sensitive structure. On the other hand, the great omentum may contain quantities of growth and yet be painless. When the pain and tenderness of a malignant growth are accompanied by a nocturnal rise of temperature and by an acceleration of the pulse it is easy to assume that the disease is inflammatory and perhaps that suppuration has occurred. But there is usually something to excite suspicion—unusual pallor, emaciation, languor, mental depression, rapid whitening of the hair, severe and long-continued pain, or a family history of cancer. I have operated upon a patient whose father, mother, and uncle died of cancer. But who can define clinical instinct? Delicacy of perception and depth of intuition which reveal to gifted men secrets hidden from ordinary mortals! The act of discrimination is rendered difficult or impossible because the growth itself may become inflamed. I believe myself that inflammation caused the growth of the left lobe of the liver, and that of the colon, to adhere to the abdominal walls. But I am puzzled to tell how the operation relieves the pain. And this brings me to another point. Not infrequently until the exploratory laparotomy an inflammatory tumour with or without pus in it is pronounced to be a growth. In the present year a tumour in the right side of the abdomen, and which competent authorities said was a growth, proved to be a collection of pus behind the colon; though another beneath the right costal arch, and which I felt sure was a tumour of the liver, began to fluctuate and was emptied of pus. Under similar circumstances

hydatids have been met with. Not long ago I found the region of the gall-bladder occupied by a mass which adhered to the liver, stomach, omentum, and transverse colon. Its removal was impracticable, but nevertheless the pain and vomiting were entirely relieved and eighteen months afterwards the patient was considered to be very well.

Clearly exploratory laparotomy is not to be undertaken with a light heart. But when it has to be done take every possible precaution that forethought can devise. The preparation of the patient should not be a tax upon the strength. An early hour in the morning is best, and nothing should pass the lips lest vomiting ensue. The patient's extremities should be warmly clad and the room should be warmed to about 70°F. The skin of the abdomen is disinfected whilst the anæsthetic is being given. The mixture of spirit and biniodide of mercury which I introduced some years ago permits this to be done with considerable certainty. The operation should be carried through with celerity and with the smallest possible loss of blood. The bleeding is sure to be greater should the anæsthetist give ether. I prefer chloroform, or chloroform and ether, or the A.C.E. mixture. But when chloroform alone is given it is usually wise to ask for the administration of a little ether before the wound is closed lest unsecured blood-vessels be overlooked. When the abdomen contains malignant disease the slightest roughness or unskilful handling will start the blood oozing from numberless little points which cannot be secured, or blood may pour from the lacerated growth. Remember that the blood of soft malignant growths flows in channels devoid of muscular walls and which cannot contract and retract like healthy vessels. The blood, too, is often thin and watery and slow to clot. I shall never forget the jet of blood which sprang into the air when I touched an ovarian cancer with the tip of the finger. Fortunately, it was controlled with temporary gauze packing and did no harm. Therefore to avoid feeling about within the abdomen a liberal incision is best. When fluid has been let out the slack abdominal walls can be lifted up and the inside of the abdomen looked at. The last of the fluid may be removed by gentle sponging with a soft sponge. The growth itself is not to be meddled with unless you decide upon an attempt at removal. In coming to this decision remember that there is no retreat. It is safer to

go on than to stop. More than once when much vascular growth has been met with I have merely ventured to touch it once to learn its consistence. But if possible a piece should be removed for microscopical examination. A stained section can be made there and then by an assistant who uses the freezing microtome. It is of the highest importance to see that every trace of bleeding has ceased before the abdomen is closed, which is done quickest by transfixing all the layers with silkworm gut sutures. Under ordinary circumstances the abdominal wound ought to be brought together layer by layer with buried sutures of twisted silk. But that is a slow proceeding, and the expenditure of time is not advisable in malignant disease. And here I would caution you not to hasten the removal of the sutures. The patient may be too ill and emaciated to heal as quickly as an ordinary person. Twice I have seen the wound come apart when the sutures have been cut too soon. Wait a fortnight and begin by taking out alternate sutures so that some remain until three weeks or a month have elapsed.

After the operation the danger of hæmorrhage must be borne in mind. Therefore stimulants, such as brandy or strychnine, should not be officiously administered. It is impossible to-day to tell you how to proceed should bleeding occur. I prefer to look my enemy in the face, and therefore in such a case I give an anæsthetic and stop the bleeding with additional ligatures or sutures. The greatest care should be taken to avoid sepsis. A case which bled in the hospital became septic and died. I have purposely laid stress upon these pitfalls so that you may learn how to avoid them. As a matter of fact cases of exploratory laparotomy do exceedingly well. The tendency is to do good rather than harm, even when much malignant disease is met with.

WE have received from Burroughs, Wellcome, and Co. specimens of their quinine and strychnine "Tabloid." The composition of this preparation is quinine bisulphate gr. 1, and strychnine sulphate gr. $\frac{1}{10}$ th. This is an excellent medicament in those cases of anorexia and impaired digestion after feverish conditions, and for patients suffering from neurasthenia or anæmia; it forms a serviceable gastric tonic. By combining quinine with strychnine the useful properties of the first drug are reinforced by the stimulating effect of the latter.

A LECTURE ON GASTROPTOSIS.

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It is convenient before entering into the question of displaced stomach to recall to mind some of the normal relations of that viscus.

The pylorus varies in position according as the organ is empty or full, being under the left lobe of the liver, quite near the middle line, when the stomach is empty, and under the quadrate lobe when the stomach is full.

The greater curvature varies in position according to the stomach contents, but the umbilicus is the lowest point it should reach after the fullest meal: the lesser curvature should always be under cover of the liver and the ribs, however distended the organ may be.

The stomach is supported below by a shelf formed by the transverse colon, pancreas, duodenum, and left kidney, and to a less extent by the œsophagus, the coronary ligaments, and suspensory ligament of the spleen.

The most fixed part of the stomach is the region of the cardiac orifice. The pylorus, though having a considerable range of movement laterally, moves but little in a vertical direction.

When the stomach has prolapsed, the organ no longer presents in the epigastrium, and when the viscus is full the upper epigastrium is not protruded. On the contrary, there will be a depression with a bulging beneath it. The absence of the stomach from the upper epigastrium is the criterion of prolapse. If the latter is of sufficient degree to be of clinical importance, the outline of the lesser curvature can be delineated when the organ is inflated, and sometimes even when it is not. When the prolapse is marked, the lesser curvature may be as low as the umbilicus.

The position of a prolapsed stomach varies. The long axis may be vertical, oblique, or horizontal. A slightly oblique direction is the most common, and the vertical the least common, though this is contrary to the views of some observers. Prolapse of the stomach of necessity involves a change of shape, and often of size, though neither of these need be of import.

Dilatation of the stomach often complicates displacement, but here there is not only enlargement of the organ, but failure of its motor power, and it is the latter which constitutes the important feature of dilatation.

Gastroptosis is frequently found in association with certain peculiar features of body framework. The subjects are spare, and often stoop; the skin is dry and lax, subcutaneous fat scanty, except sometimes in the abdominal wall; the thoracic

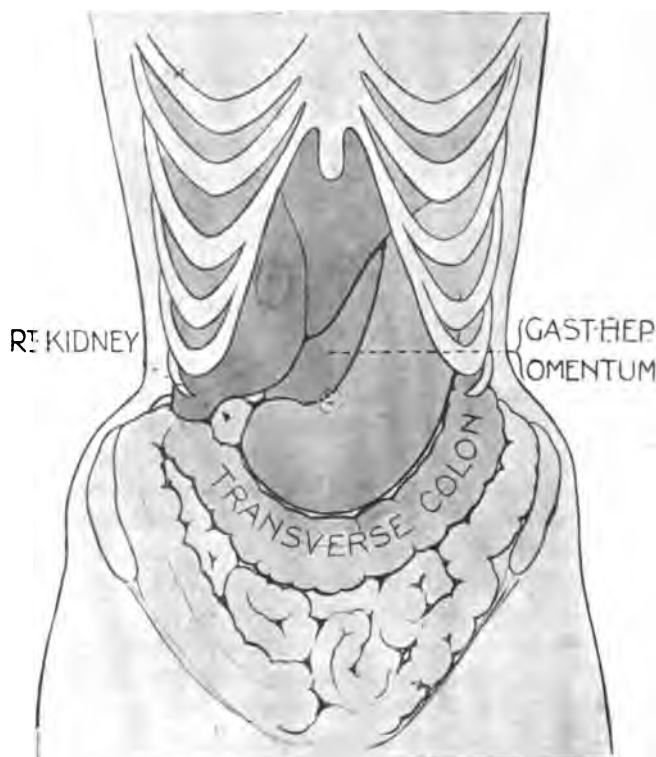


FIG. 1.—Showing visceroptosis. Note length of the thorax and obliquity of lower ribs. Note downward displacement of liver, stomach, transverse colon and right kidney.

and abdominal cavities, especially the latter, are shallow; the thoracic cage is elongated in a downward direction, so that there is but a small space between its lower limit and the iliac crest; the lower ribs are very oblique and are rigid; the lower thorax expands badly on inspiration; the downward movement of the diaphragm is marked. Stillier is of opinion that the tenth ribs are often floating, though in my experience this feature is only occasional. The abdominal wall is lax; its lower half protrudes and the upper recedes, the

epigastrium often being hollowed. Palpation is inelastic and doughy. Sometimes the contour of the stomach and the outlines of its curvatures can be felt, or even seen, but in other cases they can only be discovered when the organ has first been inflated. In a marked case there is an absence of resistance immediately above the lesser curvature, the hand going back readily to the vertebral column, and sometimes the pancreas can be felt in this position. This latter point is worthy of remembrance, for I have known a pancreas thus felt to be mistaken for a morbid growth. In some cases the kidneys and liver may be felt prolapsed, and the right kidney with especial frequency. Some writers hold that invariably there is associated ptosis of other organs, but I do not think this a correct view.

To make manifest a prolapsed stomach, we resort to inflation, transillumination, or the fluorescent screen. Inflation is done either by pumping air in through an indiarubber stomach-tube, or by the evolution of CO_2 gas within the stomach by administering tartaric acid, forty-five grains, in a cachet, and following this by sixty grains of carbonate of soda in two ounces of water. The advantage of the tube and pump is that the amount of distension can be regulated, and if the pump is connected with the tube by a side tap, the stomach can be filled and emptied at will.

Transillumination demonstrates well gastroptosis, but owing to its application being a little complicated it is less suitable as a routine procedure. In the apparatus made from my instructions (Fig. 2) the direction of the light in the stomach can be controlled and the utility of the instrument thereby enhanced. The stomach area can be demonstrated on the fluorescent screen by first administering bismuth, or better, by inflation with air, when it appears as a light area.

Symptoms are in some cases absent; when present they may be divided into—(1) those directly due to the misplacement, (2) consequent derangements of stomach functions. The former comprise aching pain in the back, a feeling of sinking at the epigastrium, and dragging down pain in the abdomen as if the intestines were sinking into the boots and that variety of weird though distressful feelings associated with gastric neuroses. Whether these nervous disturbances are produced by traction of the prolapsed organ on the nerve-fibres or whether

gastric neuroses and prolapse have some common cause is open to discussion. In my opinion, the

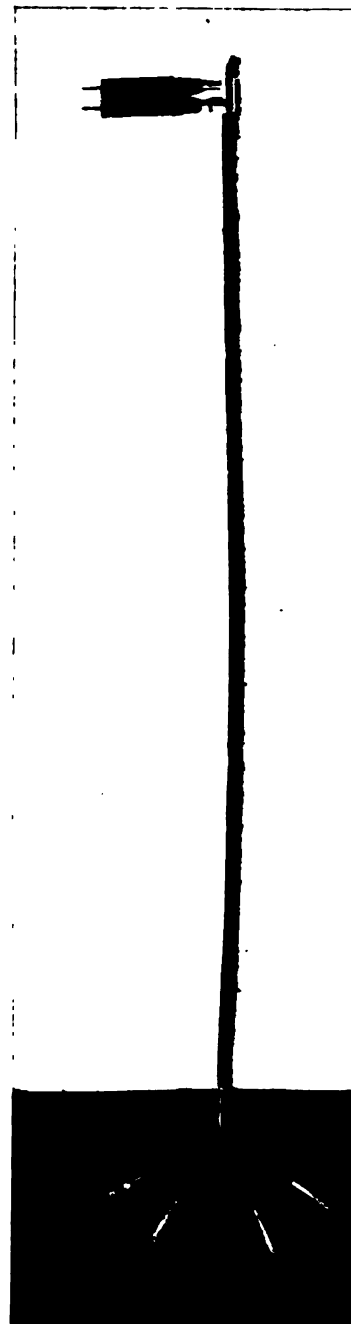


FIG. 2.—Apparatus for transillumination of the stomach.

latter is more likely the correct view. Be that as it may, cases of gastroptosis often present the manifestations of neurasthenia, both gastric and general.

The second group of symptoms involve consequent derangement of stomach functions, of which those due to impaired motor power are the most frequent. A prolapsed stomach must act at some mechanical disadvantage as far as its movements and the emptying of its contents are concerned; thus pain, feeling of fulness, flatulence (denoting undue retention of contents), are common symptoms, especially when the body is fatigued by effort.

One of the first things to do is to test the stomach motor power by administering a test supper of tender meat and bread. After the night's rest, say eight hours later, the stomach should be empty; if it is not, and there is a residuum, motility is impaired and the stomach is not emptying efficiently. In this way dilatation is apt to supervene, and the overloading of the stomach which ensues weighs down the organ, exerts traction on the pylorus, and adds another obstacle to the voiding of the contents. Once established, dilatation aggravates prolapse, and prolapse dilatation.

On the other hand, provided the motor function of the stomach remains good and the patient's occupations do not involve fatigue and strain, symptoms may be absent and the gastroptosis remain undiscovered until some derangement of function which is obstinate of cure leads to a physical examination of the abdomen; or the patient may become neurasthenic, and the displacement give rise to subjective sensations.

Causation.—In the production of gastroptosis several causes are at work, and these vary in different cases. The cause may be local to the stomach, or lie in defects of body structure.

A stomach which is constantly overloaded and is seldom empty drags on and weighs down its supports. So it is that dilatation, whether caused by pyloric stenosis or atony, is frequently complicated by prolapse.

When the diaphragm contracts on inspiration, it pushes down the viscera beneath its domes; this force, *e.g.* in the case of the stomach, is opposed by the elasticity of the visceral shelf on which the stomach rests, and by the anterior abdominal wall, and these opposing forces raise the stomach again in expiration. The weaker this upward thrust, the more will the stomach be depressed in inspiration and the less completely will it return in expiration. Hence a lax and weak abdominal wall is an important factor in the causation of prolapse.

Of great, though not equal, importance as a cause is deficient expansion of the thoracic outlet. The less the lower ribs expand on inspiration, the less accommodation there is for the viscera beneath them; on the other hand, if the thoracic outlet expands well when the diaphragm is depressed, what is lost in height is gained in width and depth, and the stomach can remain equally contained within the thoracic cage.

Another causal factor is undue obliquity of the lower ribs (Fig. 1). It has been pointed out by Mr. Keith that the more the six lower ribs approach the vertical, the lower is the level at which the fibres of the diaphragm are attached to them, the more near the vertical these fibres become and therefore the more they tend to depress that structure, and with it, the organs beneath it.

Given, then, a weak and lax anterior abdominal wall, a rigid thorax whose lower half expands but little, and very oblique lower ribs which almost meet the iliac crest, and the conditions are there for the production of prolapse. Imagine further a period of ill health in which the motor power of the stomach fails, and the organ is overcharged and the liability to ptosis becomes even greater. When once displaced, the viscus may not completely return, though its motor function may do so in spite of the mechanical disadvantage of the lower position.

Prolapse is thus found in cases of general weakness and debility, repeated pregnancies, getting about too soon after childbirth on the one hand, and rickets, pigeon breast, depressed sternum, tight lacing, on the other hand. Tight lacing is a potent cause amongst women, and especially in those who are long waisted, whose frames are spare, whose abdomens are shallow and muscular development poor.

Diagnosis.—Gastroptosis need not, *per se*, cause any symptoms, and may be discovered merely by chance during physical examination.

As has already been explained, the mapping out of the lesser curvature beneath the thoracic margin determines the existence of prolapse, and enables a diagnosis to be made between it and dilatation.

Whether dilatation co-exists with prolapse, as it frequently does, is determined by the measurement between the two curvatures, and better by an estimation of the motor power of the stomach-wall. The latter is conveniently done by giving a test

supper of minced meat and bread with 10 oz. of water before bed-time. Seven hours later the stomach-tube is passed, and if the viscus is not empty of food there is dilatation.

Cases of gastropsis may manifest symptoms suggestive of malignant disease or of ulcer of the stomach. Thus, pain after food, tenderness, vomiting, and rarely hæmatemesis, may occur, coupled with general wasting and weakness. The occurrence of bleeding is partially explained by the congestion of vessels produced by the traction of the displaced organ.

Treatment.—The indications are to strengthen the supports of the stomach, and chiefly therefore the anterior abdominal wall; to avoid the downward drag of the organ; to maintain in efficiency its motor functions; to promote general nutrition and avoid fatigue.

The food selected should be nutritious and readily digestible. It is important to avoid foods which are long and difficult of digestion, or which easily give rise to putrefaction. Fat foods like butter and cream are good, though they have to be given with caution to prevent digestive disturbance. Food should be taken more frequently than in health, for these cases stand long intervals badly, and it will often be found, that symptoms have occurred or returned largely because the patient has been compelled by the exigencies of his life to go four, five, or more hours between meals. It should thus be arranged that half-meals are taken between the ordinary full ones. Rest in the recumbent posture for one, or better two, hours in the middle of the day is important. This takes the strain off the weak abdominal wall, relieves the traction of the displaced stomach, and prevents the supervention of dilatation. The benefit of this rest may be increased by raising the foot of the couch 9 to 12 in. In bad cases lying down after each meal may be necessary. Sometimes a prolonged term of rest in bed is required, especially when symptoms of gastric neurasthenia are prominent.

Daily massage is valuable to strengthen the anterior abdominal wall and also to maintain the motor power of the stomach wall. Electricity is of some (though less) use to obtain the same ends.

The anterior abdominal wall is also strengthened by exercises. One of the best is as follows: The patient lies flat on his back on the floor, and slowly raises himself into a sitting posture without raising

his heels from the ground, and without assistance from his hands. This procedure is repeated several times in succession.

The stomach may be supported by an abdominal belt which applies pressure to the lower abdomen. I have employed a specially constructed truss, the supporting pad of which is applied to the lower abdomen and exerts pressure upwards, backwards, and to the left.

Lavage should never be employed for simple prolapse, but if there is added dilatation, it is a valuable treatment to avoid retention of stomach contents.

It is most important to maintain the motor power of the organ, in spite of the mechanical disadvantages produced by displacement.

As regards drugs: if gastric secretion is very feeble, alkalies and bitters before meals or pepsin with the meals should be prescribed. With dilatation bismuth, or the double salicylate of bismuth, and cerium with strychnine are useful. If the symptoms are neurasthenic, glycono-phosphates of calcium and iron with strychnine or arsenic are of value.

Concerning surgical treatment, gastro-enterostomy is useless for gastropsis; though if there is much dilatation and this does not yield to medical treatment, short circuiting between stomach and bowel may become desirable. An operation for re-fixing the displaced stomach has been suggested and tried.

Treatment of Aneurysms of Large Vessels by Gelatin Injections.

—According to Lancereaux, the method of using gelatin injections in the treatment of aneurysms of the aorta is never dangerous if care is taken to use solutions of gelatin which are of good quality and which are well sterilized. These injections favour the coagulation of blood in the aneurysmal sac, and in this way they aid in the cure of aneurysms of the large vessels, which are so alarming. Tetanic accidents or others, which have been noted as following this treatment, have been produced either by the employment of gelatin solutions of poor quality, or by the use of solutions insufficiently sterilised.—*Revue Française de Médecine et de Chirurgie.*—*Medical Record*, vol. lxvi, No. 24.

A CLINICAL LECTURE
ON
AORTIC STENOSIS.

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GENTLEMEN,—There are several reasons why I have chosen the subject of aortic stenosis about which to say a few words to you this afternoon. One reason is that a diagnosis of aortic stenosis is very frequently made when no such lesion is present. You will see this well illustrated if you will turn to Walshe's great book on the heart, where you will find that, in treating of the relative frequency of valvular lesions, he places aortic stenosis second in the list—that is, that Walshe considered aortic stenosis to be more common than either aortic regurgitation or mitral stenosis. We have considerably advanced in our knowledge in this respect, for we now know that pure aortic stenosis is a comparatively rare disease. In the post-mortem statistics published by Sidney Phillips we find that in 151 cases of valvular lesions there were only 11 cases of pure aortic stenosis. May I quote the figures to you. Of these 151 cases he found that mitral regurgitation accounted for 49, mitral stenosis for 53, aortic regurgitation for 38, and aortic stenosis for 11. Why did the great writers on this subject in former times make the mistake of thinking that this lesion was comparatively speaking so frequent? It was because they considered that all cases where a systolic bruit was best heard over the aortic cartilage were those of aortic stenosis, whereas now we know that other evidence is required, such as the characteristic pulse and the presence of hypertrophy of the left ventricle, before we are justified in making such a diagnosis. Though at the present time we have more light on this subject, one constantly sees the old mistake made still; that is, aortic stenosis is frequently diagnosed from the mere presence of a systolic murmur heard at the aortic area, although there are such definite and ready means at our disposal to determine what is the true significance of such a murmur. Another interesting though sad feature of this disease is that the progress in a majority of the cases is not nearly so good as we

would at first think, but I will refer to this fact later.

Ætiology and morbid anatomy.—Regarding the ætiology of the disease, it is always important to inquire fully into the cause, because of the light it gives in regarding the prognosis. While the condition may be the result of an attack of acute endocarditis, it is much more commonly due to a sclerosis of the valve. In the latter group of cases the prognosis is not nearly so good. This sclerosis usually comes on insidiously during or after middle life, and is usually associated with arterio-sclerosis. Severe and constant muscular exercise, such as you get in the occupation of a hammerman, is quite a sufficient cause, for it gives rise to a more forcible closure of the aortic cusps.

All conditions causing high arterial tension, such as we have in gout or Bright's disease, act in the same way. Thus, aortic stenosis is more frequently found in men of middle life or old age.

The morbid anatomy does not concern us much. In those cases which are the result of sclerosis the obstruction is mostly due to thickening either of the cusps or of their line of attachment; whereas in those cases which are caused by endocarditis the obstruction may also be set up by vegetations which later on undergo degenerative changes, or by an attachment of the margins of the cusps to each other giving rise to a funnel-shaped opening.

Result.—Whatever the situation or nature of the constriction, we get a mechanical obstruction to the flow of blood from the left ventricle into the aorta, and of necessity there must as a result be either an increase in the driving power of the heart in order to overcome the obstruction, or, if this does not occur, there is a slowing of the circulation; for obviously the same force will not drive the same amount of blood in the same time through a constricted orifice as through one of normal size. Therefore, in order to maintain the proper rate of circulation, the left ventricle acquires an increased power by undergoing hypertrophy. This is a good illustration of the physiological law that increased functional activity causes an increase in structure. Until compensation begins to break down there is no dilatation of the left ventricle simply because there is no call for an increased capacity of that chamber. But from practical experience we all know that dilatation of the left ventricle almost invariably follows sooner

or later. This may be due to simple failure of compensation, but it may be brought about in another way, which it is as well that we should understand. It is because the more powerful contraction of the hypertrophied left ventricle increases the pressure in the ventricular cavity, and thereby puts a constant strain upon the mitral valve, so that it eventually gives way and mitral incompetence is brought about. It is said by some that this yielding of the mitral orifice acts as a safety-valve; but be this as it may, we all know that the super-vention of mitral regurgitation means a downward step in the course of the disease.

The most important point of the morbid anatomy, and one which I want you to particularly remember, for it has such great significance in the matter of prognosis, is that in the sclerotic forms of aortic stenosis there is apt to be some obstruction of the coronary arteries, and when this is the case, degenerative changes of the myocardium, usually fatty or fibroid in nature, are almost sure to follow. It is always well to be on the look-out for indications of fatty heart in all cases of aortic stenosis.

Symptomatology and physical signs.—Regarding the symptoms of the disease, they may be altogether absent in cases where compensation is fully maintained; or there may be some pallor of the face, and in the early stage the patient may complain of weakness, attacks of syncope, or dyspnoea on exertion. Later on these symptoms are aggravated, and pain becomes a frequent symptom. It may be true angina, or in the form of anginoid attacks. Sleeplessness is a prominent symptom, or the patient may suffer from terrible dreams, due to the cerebral anæmia. Severe paroxysms of dyspnoea are by no means infrequent. On the other hand, breathlessness on lying down is not so common. Dropsy is not a common symptom, and if it is marked, we can usually infer that mitral incompetence or kidney disease has supervened. When mitral incompetence has become established we get the usual symptoms of that condition.

As the pulse is of such great value in diagnosis, it is important that we should know its character. It is usually slower than normal, regular, and distinctly small. The initial percussion wave is slight and gradual, and the pulse-wave, as we should expect, is slow, prolonged, and does not strike the finger abruptly but raises it gradually—this is the important characteristic. The blood-pressure

varies according to the resistance of the circulation. If there is a considerable degree of arteriosclerosis the vessel walls are rigid and their elasticity is wanting, but if there is no considerable sclerosis, they are yielding and elastic. In the later stages of the disease the pulse usually presents some of the characters which are associated with mitral incompetence. There may be a perceptible bulging of the precordia. The apex beat is an interspace or more below the normal, and not greatly displaced outwards. Will you please remember its character. It is a slow, deliberate push of moderate severity. A thrill, systolic in time, is sometimes felt at the base of the heart, and it may be conducted over the precordia and even over the whole chest. This thrill, when present, is of considerable diagnostic import. On percussion the area of cardiac dullness is found to be enlarged, chiefly towards the left side. The left margin of the heart usually extends considerably below the normal and somewhat outwards. The right margin of the heart is usually little altered unless mitral incompetence has supervened. On auscultation in the mitral area the first sound is not loud, but it is prolonged and dull, and may be accompanied by a murmur. At the base of the heart a bruit is heard either accompanying or replacing the first sound. The duration of the murmur varies considerably; it is usually long, however. The point of maximum intensity is commonly over the aortic cartilage, but remember that it is extremely variable; for example, it may be about the middle of the manubrium sterni, or to the left of the sternum. The usual line of propagation is upwards along the right margin of the sternum to the right sterno-clavicular articulation, and to the carotid vessels in the neck. The bruit may be heard along the right margin of the sternum lower down, sometimes to the fourth or fifth interspace. Or it may be heard to the left of the sternum, becoming lost over the right ventricle, but reappearing at the apex of the heart, being conducted by the walls of the left ventricle. Occasionally the murmur is heard over the thoracic aorta along the spine. In character the bruit may be loud, even extremely loud, or it may be comparatively soft. It is often rough and vibratory, but it may be smooth and blowing, or musical. The character of the second sound is of the utmost importance, for it is a guide to our diagnosis. In pure aortic stenosis unaccompanied

by roughening of the valve or dilatation of the aorta above the orifice, the second sound is diminished or lost. The main reason for this is that, on account of the slower filling of the arterial system, there is a less sudden recoil of blood, and consequently there is a less forcible closure of the cusps.

Diagnosis.—We will go into this matter somewhat fully because of its great importance. First of all exclude cardio-pulmonary sounds, which are sometimes very deceptive. They are more distinct during expiration, and disappear when the breath is held after a deep inspiration, and often when the patient lies down. Secondly, exclude hæmic bruits. These occur in young anæmic girls or during the convalescence of some acute illness. The murmur may be propagated to the right sterno-clavicular articulation and into the neck, but there is no characteristic pulse, there are no signs of cardiac hypertrophy, and there is no basic thrill to be made out. Thirdly, since the murmur of aortic stenosis is sometimes heard to the *left* of the sternum, it may simulate pulmonary obstruction. One point alone is enough to prevent us making any mistake, for never do we find a pulmonary systolic bruit propagated into the arteries at the root of the neck. Fourthly, exclude pressure upon the aorta by a mediastinal tumour where no definite pulsation is present. There is, however, usually an area of dulness to be made out, and almost never do we get any alteration in the character of the second sound.

Now, having excluded these four conditions, we are left with the two conditions which are most often mistaken for aortic stenosis, namely, (1) a mere roughening of the cusps or orifice; and (2) a dilatation of the aorta just above the valve, or what is called "relative stenosis." In both these lesions we have a well-marked systolic murmur, best heard over the aortic cartilage. Now, can we determine what is the true significance of such a bruit? A history of rheumatic fever may be of some slight help, for it favours the conclusion that we are dealing with a case of stenosis. But we have not to rely upon such empirical evidences as this, for we have much more definite means at our disposal. It is here that the pulse is of great value, because if it has the characters already described, especially that of raising the finger gradually instead of striking it abruptly, we can be fairly certain that

we are dealing with a case of stenosis. Again, if on physical examination there is found unmistakable evidence of hypertrophy of the left ventricle, together with a systolic aortic murmur in a young person who has not kidney disease, it affords strong evidence of the existence of constriction of the aortic orifice, and the evidence becomes stronger when the cardiac impulse is a slow deliberate push of moderate severity. If the patient is a person of middle life or advanced age, there may have been long-continued resistance in the peripheral circulation, and therefore high arterial tension, giving rise to cardiac hypertrophy. How can we form a diagnosis here? It is by the character of the second sound in the aortic area, and I beg of you to remember this fact. In aortic stenosis the second sound is diminished or lost unless there is accompanying arterio-sclerosis. In a mere roughening of the valve the sound is, on the other hand, accentuated, and in dilatation of the aorta it is not only accentuated but low-pitched, ringing, and usually heard over a much wider area.

There is only one other point in the diagnosis which I want to allude to, and it is this: As you know from your practical experience, in many cases of aortic incompetence, besides the usual diastolic murmur, there is frequently heard a systolic bruit also. This systolic murmur does not necessarily imply that there is stenosis as well as incompetence, for we may be dealing with a mere roughening of the valve segments or dilatation beyond the ring. How are we to tell whether there is stenosis or not? By carefully observing the condition of the pulse; for if there is stenosis present the sudden and collapsing character of the pulse is either modified or lost.

Prognosis.—Now, I feel fairly certain that if you were asked to give an opinion as to whether the prognosis is better in aortic stenosis or in mitral incompetence most of you would say that it is better in the former, because you would remember the simple fact that the left ventricle has a greater capacity for compensation than the left auricle. Formerly most authors had this opinion also, but in their case it was due to the fact that they thought that all cases where an aortic systolic murmur was heard were those of aortic stenosis. Let me, however, refer you again to the statistics published by Sidney Phillips. He found that the average age at death was about forty, and that

the oldest was fifty-three; so you see the prognosis is as a rule not so good as in mitral incompetence. It is true that when the stenosis is the result of an attack of acute endocarditis it is better. But when it is due to sclerosis of the valve—as it usually is—there is a tendency for the constriction to increase, and consequently dilatation of the left ventricle follows and mitral incompetence is established. I have pointed out that incompetence of the mitral valve may be brought about in another way, namely, by the increased pressure in the cavity of the hypertrophied left ventricle causing a strain upon the valve flaps, so that they eventually give way. This supervention of mitral incompetence always marks a downward step in the course of the disease; and, furthermore, once dropsy has set in from backward pressure, there is smaller chance of recovery than in other valvular lesions. But I am sorry to say that we have yet to deal with a still more gloomy side of the picture. When the obstruction is due to a sclerosis, the damaged aortic valve may yield to such a degree that incompetence is established later on. Or the degenerative process may involve the orifices of the coronary arteries, and cause fatty degeneration of the myocardium, and I would therefore warn you to be always on the look-out for indications of fatty heart in these cases.

Treatment.—When we come to treatment will you allow me to say that I do not think that the importance of careful treatment in valvular diseases is sufficiently estimated. It is true that we cannot cure a stenosed valve, but it is none the less true that we can by therapeutic measures often extend the life of a patient by several years. If a person is suffering from an attack of acute endocarditis, we should keep him in bed or in the recumbent posture for some weeks after the attack is over, so as to give the heart a sufficient opportunity for compensatory hypertrophy. After this our guiding star regarding the amount of exercise or labour we should allow our patients should be that such exertion must not be attended with any undue breathlessness or exhaustion, particularly the latter. Furthermore, we should warn the patient to enter upon the exercise gradually; and, therefore, it is a good thing, for example, for him to commence going up a hill or upstairs at a slower rate than walking on the level. If the

patient is rheumatic, he should carefully attend to this so as to prevent if possible any further damage being inflicted to the stenosed valve. The meals should be fairly equal, because large meals cause considerable variation in the blood pressure. I need hardly say that very strict moderation in regard to alcohol is necessary; it is really better that the patient should be a teetotaler. It is most important to attend to the condition of the bowels. Accumulation of fecal matter in the intestines causes flatulent distension of the bowel, which by pressing on the diaphragm embarrasses the heart. This is one of the most frequent causes of palpitation. In those cases which are not the result of acute endocarditis, but which are due to sclerosis, much benefit is often obtained by the long-continued administration of moderate doses of iodide of potassium, whether the sclerosis is due to syphilis or not. It should always be tried. The two great cardinal points which I want you to remember in the treatment of this disease are, firstly, to avoid anæmia at all costs; and secondly, to prevent high arterial tension. Anæmia should be avoided in order to prevent as far as possible the tendency to fatty degeneration by supplying the heart with rich blood, and the obvious reason for endeavouring to prevent high arterial tension is because the obstruction already existing is added to by any peripheral resistance. Alcohol and excesses of food should be avoided, especially of a highly nitrogenous character. Potassium iodide and nitrate of sodium are the most useful drugs. When compensation begins to fail rest in the recumbent posture is absolutely essential. Rest is by far the most efficacious therapeutic measure we have at our disposal in the treatment of valvular disease. Other remedies are of little avail unless the patient can rest. Freedom from mental work or worry is also highly important, for the brain is a very vascular organ. Regarding digitalis, opinion is divided as to whether it should be given or not. You must remember that we are dealing with obstruction in front of the left ventricle, and digitalis by its action in contracting the peripheral vessels increases the obstruction; indeed, its administration may in some cases be the direct cause of sudden death. When the loss of compensation is mainly shown by defective driving power, and is manifested by such symptoms as faintness, giddiness, or anginoid attacks, there is no doubt that it may do harm. But on the other hand, we may derive some benefit from its administration, if the symptoms are chiefly due to backward pressure—in other words, when the symptoms and physical signs point to mitral incompetence.

In the main, however, it is better to rely on iron, arsenic, and strychnine, and when the symptoms are indicative only of defective propulsive power, especially if there is accompanying high tension, vaso-dilators are strongly indicated. When the patient complains of pain and palpitation we should treat any possible flatulence either of the stomach or intestines, and reduce the blood pressure if it is high. A belladonna plaster applied to the precordia is useful. Should these means fail, morphia may be necessary.

The sleeplessness is often very troublesome. Paraldehyde in doses of from 3j to 3ij is a splendid drug for this purpose. Its taste is partly concealed by giving it in milk. Trional is good, as also is chloralamide given in hot liquid. I have found great benefit derived from the administration of tincture of henbane in 3j doses in a little hot brandy. This often acts like a charm. Should these means fail, and there is no kidney disease or cyanosis, morphia is strongly indicated. It acts much better when given hypodermically. If the patient suffers from vomiting, stop the digitalis if you have been giving it. Bismuth and hydrocyanic acid may be of service; but if the vomiting is severe, try peptonised milk in 3j doses every hour, milk and lime-water, or iced champagne.

When mitral incompetence has set in, and there are all the symptoms of backward pressure and failing right heart, we should treat the patient as you would treat any other case of mitral disease, and I need not enter into the subject now.

I trust, however, that the few points I have laid before you will be found useful to you in your general practice, and that you will especially not forget that simple aortic stenosis is a comparatively rare disease, and that the prognosis is frequently far from favourable.

INTERNATIONAL CLINICS, vol. i, fourteenth series, 1904, and vol. ii, fourteenth series, 1904. (J. B. Lippincott and Co. London, 1904.)

The most important and the largest part of the first of these volumes is an account of the progress of medicine during the year 1903. The medical portion is under the charge of Dr. David L. Edsall, who has made a valuable collection of recent advances in medical work, but has been compelled to condense his remarks to such an extent that their value is much impaired. Dr. Joseph H. Bloodgood, in the surgical section, notes that surgical technique is in advance of surgical diagnosis. We think there is a great deal of truth in his remark that "much of the successful surgery in this and other countries is due as much to the thorough clinical investigation by the physician as

to the skill of the operator." In this article there is an extremely valuable chapter on tumours, which is profusely illustrated, and which deals more especially with congenital cutaneous growths and their subsequent developments. One of the most interesting and novel contributions is on the subject of the chloride reduction treatment of parenchymatous nephritis by Drs. Widai and Javal of Paris. They have succeeded in showing by direct experiment in cases of nephritis that salt (NaCl) is a most important factor in the production of cedema and excessive albuminuria. From this they argue that milk, which has been found empirically to be so good a diet in nephritis, is so in virtue of the small amount of salt it contains. They are able to go further and suggest additions to a milk diet, which are equally valuable owing to an absence of salt. The experimental part of this work is so carefully elaborated that it cannot fail to carry conviction, and we think that the future treatment of Bright's disease will be considerably influenced by this research. An attempt is made in this volume to reproduce some photographs in colours, but we cannot say that the result is either an artistic or a realistic success.

The second volume opens with a series of illustrated articles on the diseases of warm climates, which ought to prove valuable to practitioners abroad. The recent advances in connection with tropical diseases have been so rapid and so important that a periodic survey of the whole subject is essential for all who are practising in hot countries. The pathological researches of home and colonial workers have been rewarded by many valuable discoveries in connection with the transmission of disease and the blood-changes present, and we hope that their indomitable energy may be rewarded in the near future by further advances in prophylaxis and treatment. Dr. Kanellis of Athens writes on the subject of bilious hæmoglobinuric fever, and concludes that there are two distinct varieties—those cases due to malaria, and those due to quinine. As regards the general medical articles we note with interest one by Dr. J. A. French of California on the limitations of the utility of digitalis in heart disease. In the surgical section Mr. Stanmore Bishop continues his lectures on abdomino-pelvic diagnosis, which are extremely practical, and Dr. C. G. Cumston discusses the various forms of intestinal obstruction in children.

THE SURGICAL TREATMENT OF BRIGHT'S DISEASE.

By GEORGE M. EDEBOHLS. (Publisher: F. F. Lisiecti, New York. 1904.)

We really think that this is the most unconvincing book we have ever read. The last words of it are: "The evidence submitted, in the author's opinion, not alone justifies the surgical treatment of chronic Bright's disease, but establishes surgery as at present the main, if not the only, hope of sufferers from a hitherto incurable malady." The word "surgery" here mentioned means decapsulation of both kidneys. Our opinion of the evidence does not coincide with the author's. The book contains an account of 72 patients upon whom the operation was performed. It is stated that "Finally, we reach the seventeen cures of chronic Bright's disease attained as a result of operation." These seventeen cases are grouped together in Table IV. On going through the detailed history of each of these seventeen cases we find that in six the Bright's disease is stated to have been unilateral. It altogether passes belief that if Bright's disease was so advanced in one kidney as to be visible to the naked eye at an operation in which the outside of the kidney only was seen, yet it should be unilateral. It is true the author says this may be "a matter of surprise to many of my readers." It is such a surprise that any writer with any idea of scientific accuracy would have attempted some proof. Early stages of chronic Bright's disease are very often seen in the post-mortem room in those dying of various diseases, so that proof might easily have been sought. Until this is done, the correct frame of mind is to disbelieve that patients said to be suffering from unilateral Bright's disease were suffering from this malady.

Again, all but one of the seventeen patients were women—four were twenty years old or under, five were between twenty and thirty, seven were over thirty and under forty, and one was forty-five years old. Chronic Bright's disease is not particularly commoner in women than in men, and it is commoner at ages over forty than under. Here, too, then, there are grave reasons to doubt whether the author's patients had Bright's disease, and our doubts are much increased by noticing that in thirteen out of seventeen one or both kidneys were movable, and by remembering that vaginal discharges frequently cause albuminuria, and that persons under thirty are liable to functional albuminuria. However, to show the style of clinical

observation, let us look at the case at which the book happens to fall open: No. 23, a woman, æt. 34 years. Her word is taken for it that a doctor "diagnosed" albuminuric retinitis in 1899 (there is no note to say that Dr. Edebohls looked himself to see if the patient's eyes were healthy). The urine was examined "some 50 times" in three months, and "on only six or eight occasions" was albumen found. The patient is stated to have had fibroid infiltration of the apex of the right lung in April, 1902, and a mitral regurgitant murmur. She had both the kidneys decapsulated, and we are assured that they were examples of chronic interstitial nephritis. In this case a small piece of the kidney, torn away with the capsule, was examined microscopically. This woman was alive in 1904. There must surely be a mistake somewhere; if not, the patient is an extraordinary woman to have had albuminuric retinitis for five years, yet albumen present only in 12 to 16 per cent. of the times the urine was examined; in spite of albuminuric retinitis, mitral regurgitation, fibroid disease of one lung, chronic Bright's disease, and a major operation this extraordinary woman is still alive, five years after the condition of the eyes was discovered. It is more likely that errors of observation should occur than that such things should happen. Perhaps the key to the difficulty lies partly in the author's remark that the patient has "a vast array of nervous symptoms to complain of."

If space permitted, we could criticise other parts of the book in the same way. The reports of cases are so slovenly as to be useless except as a guide to the state of mind of an author who says he thinks such stuff is proof. For example, Case 12: "Heart: loud systolic bruit over left ventricle." The reviewer can only say that any third-year student who described a patient's heart to him in that way would be most severely reprimanded. Again, the total urea passed daily is often given. Surely the author knows that this is quite valueless unless we know the amount of nitrogen in the food.

No attempt whatever is made to contrast the author's cases upon which decapsulation was performed with other cases of Bright's disease in which no such operation was performed. The writing is as careless as the matter. On page 144 the author wishes to tell the reader that his patients were grateful. This is how he expresses himself: "The vast majority—I might almost say all—of my patients have proven themselves to be of the grateful variety." He seems to be as ignorant of the art of writing as he is of pathology and morbid anatomy.

In conclusion, we can only hope that any one contemplating decapsulation of the kidney for chronic Bright's disease will pause, and before doing so read this work. He will then quickly see that it at least is not the slightest warranty for such an operation.

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DYSPEPSIA.*

By FRED. J. SMITH, M.D., F.R.C.P.,
Physician to the London Hospital.

LADIES AND GENTLEMEN,—Probably if there were no such thing as indigestion half your daily work would disappear; and yet, common as the genuine disease may be, there can be no possible room for doubt that under its all-covering flag a great deal of trouble is placed for which the stomach is by no means responsible, at any rate in a primary degree.

A little personal experience of my own will illustrate this statement, though indeed illustrations are scarcely needed of such a well-accepted fact. Many years ago when a boy at school I received a severe blow on the sternum at football; the game ceased immediately afterwards, and I, standing about in a cold wind, probably got chilled. Be that as it may, I was ill within a quarter of an hour with a severe pain in the chest, and it was not till ten days later that pleurisy was discovered in my right chest; our school medical officer had persisted in naming my trouble indigestion for ten days. I was too young at the time for me now to remember the precise means taken to diagnose either the indigestion or the pleurisy: I can only remember how ill I felt during the time.

For such mistakes the responsibility does not rest entirely with the medical man; the exigencies of practice—time is not an inexhaustible or unlimited possession of either doctor or patient—must of necessity leave many cases, in their early stages at any rate, without that thorough physical examination and verbal catechism which are essential for a satisfactory diagnosis; one may, however, lay down as a golden rule that no patient complaining of gastric symptoms, *i.e.* symptoms which might be due to indigestion, should ever be

* Delivered at the Medical Graduates' College and Polyclinic.

allowed to remain without this catechism and examination if his "indigestion" has not yielded to simple treatment within a week or ten days; time *must* then somehow be found for such procedures as will enable a satisfactory diagnosis to be arrived at; at least, a thorough attempt must be made in this direction, though it must be admitted that even after such attempt the diagnosis may remain obscure.

We may first of all consider the ætiology of indigestion.

I am quite sure that the minutiae of modern chemical analyses and experiments on animals have somewhat led us astray from the best methods of studying and analysing indigestion, which undoubtedly lie in a keener appreciation and apprehension of the commonplace. The commonplace I call it, and advisedly so; for the cases for study occur to us in innumerable instances every day, and surely observation and experience should be the possession of everybody.

The chemist analyses with exactitude, and gives us tables of the precise proportions of sugars, starchy food, albumenoid elements, salts, and water in various milks and other articles of food; but he is totally unable to inform us why one person is made very unhappy by a glass of the same milk, beer or wine, or a piece of the same cheese, lobster, beef, pork, mutton, veal, etc., that another person not only takes with pleasure, but digests with ease and converts into nourishment for his tissues, with but a minimum of waste, nor can he tell us the reason why one utilises a larger proportion of his food than another. Yet these are the commonplace problems that are at the bottom of hundreds of cases of dyspepsia and on the correct solution of which satisfactory treatment must eventually rest.

The essential ætiological factors in indigestion are two: (a) the food put into the stomach, and (b) the habits of the individual who owns the stomach in question. The original quality of the stomach itself I am purposely omitting from this lecture.

Commencing with a baby, it must be within the experience of us all that we have very frequently indeed met with very young babies who from a very early period after birth have seemed to be incapable of digesting their food properly. But is this not almost invariably due to the fact that we

have allowed the chemist and the sanitarian to have too large a share in the manufacture, and preparation, respectively, of that food? One does meet with babies who are taking only the breast, and who yet seem to do badly; but such cases are rare, and I have never yet seen even one such when the mother's health, occupation, and diet have all been above suspicion and the baby itself quite free from inherited or congenital disease and deformity, and I very much doubt the existence of such cases.

But of babies taking boiled, sterilised, Pasteurised, etc., milk, or artificial foods, which of us has not seen dozens, I might say hundreds such, failing and fading and eventually developing infantile scurvy, or rickets, or some other well-pronounced disease or dying of simple marasmus, which is a scientific term for sheer starvation? Even here, however, so tolerant is the stomach of misuse, so adaptable to its surroundings, and so well does it make the best of unfavourable circumstances, that the trouble is never called indigestion because the baby does not vomit, and cannot complain of indigestion except by crying; yet surely this is the rational commonplace name to give to the trouble which has been at work along. In extreme infancy indigestion is cloaked under many names and arises from only one cause, viz., the food, though we often enough physic the poor innocent stomach.

When babyhood has passed, the second factor viz., habits, begins to play its part in the production of indigestion. Does a healthy schoolboy suffer from it? Assuredly not, so long as he is rationally treated: his stomach will stand a great deal of unfair usage even when originally it was none of the strongest. How is the schoolboy fed? or rather, how should he be fed (for I doubt if now his diet is as free from reproach as it used to be)? He should be fed on plain food properly cooked—bread and butter, porridge, bread and milk, roast and boiled joints. With these his stomach is built to deal; but let him have bad teeth, let him stuff himself with rich cakes and smoke surreptitious cigarettes what time he should be playing cricket, etc., or tearing over the open country, and we soon hear a different tale. Pale, pasty face, constipation, shortness of wind, discomfort after food, soon make their appearance, and our schoolboy is suffering from indigestion, which luckily can, as a rule, at this time and stage be easily put straight.

Now for the adult. What is it that causes his

indigestion? Surely the man who comes to us saying, "Whatever I eat sticks there" (pointing to the epigastrium); "I'm blown up with wind; I have to be awfully careful what I eat; I dare not eat a bit of this, that, and the other"—surely such a man is the victim of his own habits, and we usually have but little difficulty in laying our hands on those which want correcting. He has for years perhaps been bolting his food to hurry to the train (break-fast) or to get back to business (lunch), or smoking freely on an empty stomach, or taking several whiskies and sodas *between* meals. With all this he has quite possibly been much worried over business matters, taken his office work home with him for after-dinner study, never allowed himself sufficient holiday. In all these directions dyspepsia lies.

With women we get a somewhat different series. With the onset of menstruation comes anæmia, a frequent source of indigestion or worse, and with the advent of young ladyhood comes tight lacing, etc. With marriage and child-bearing come insufficient exercise, injudicious cups of tea, household worries, all of which can easily upset the stomach—not to mention uterine reflexes.

Thus throughout life wherever we meet with indigestion we may be sure that the history of the patient contains the clue to the cause, and it must be carefully searched for the same.

I may here quote a few cases in point.

Worry as a probable cause.—M., æt. 50 years. Dyspepsia some years on and off, acute pain an hour or so after food, worse for last month. Hæmatemesis after lunch. Saw him five months later with similar symptoms. Mental symptoms—worry for years and overwork.

Marriage as cause.—Mrs. R. Flatulency, frequent micturition, began a month after marriage. Tongue clean, appetite good, much splashing. Irritability of bladder and general anxiety about herself. Neurotic.

Constipation.—Too numerous to need illustration. So blown up after food. Much splashing, miserable and heavy sensations.

Phthisis.—M., æt. 20 years. Advanced phthisis. Much wind and flatulent constipation.

Overworked.—M., æt. 32 years. Doctor said heart was weak.

Over-eating.—M., æt. 25 years, Jew. Nasty nervous attacks, heart thumps, goes cold and

cannot stand, much wind, appetite too good, enormous eater, some splashing.

Worry.—M., æt. 56 years, b. open every day, occasionally diarrhoea, much wind; so tired cannot stand business worry.

Nervous.—M., æt. 29 years (mother and two sisters the same). Indigestion two or three years, pain in epigastrium first, much wind, constipated, sleepy.

Senile.—F., æt. 66 years. Constipated, pain in epigastrium two months, bowels irregular, probably carcinoma but relieved by Sodæ bicarb. M., æt. 51 years, six or eight years tremendous acidity, vomits three or four times a day, intensely acid, stomach dilated. Acid vomit against carcinoma. M., æt. 59 years. Severe pain two to three hours after fluid, pain relieved by food; nothing to be felt in abdomen at all.

Anæmia.—F., æt. 27 years, always had dyspepsia, fearful attacks of pain, vomiting with sometimes spasm, food, much flatulence.

DIAGNOSIS OF DYSPEPSIA.

To an audience of qualified practitioners there is no need for me to enumerate a list of diseases with which dyspepsia is associated; perhaps those which are most commonly overlooked are anæmia, morbus cordis, incipient phthisis or obscure nerve lesions, or, on the other hand, some abdominal trouble of organic nature such as movable kidney, ovarian tumour, uterine disease, or even carcinoma; but for all that, it will conduce to clearer ideas on the subject and simplify diagnosis if I classify for you the various groups of troubles into which the "dyspepsias" of our patients may be divided. In all of the following the patient may suffer from gastric symptoms and make his own diagnosis of "indigestion."

1. The stomach itself perfectly healthy, but induced to empty its contents or cause trouble through purely reflex nerve channels. Cases of this sort are very common; for instance, the vomiting of cerebral tumour or tubercular meningitis in their early stages, the gastric crises of tabes, the vomiting and indigestion of pregnancy and of uterine or ovarian disease, and the vomiting of Addison's disease may be noted here.

2. The nutrition of the stomach impaired, either by imperfect circulation of healthy blood or the circulation of unhealthy blood; of such cases there

are numerous examples—heart disease, simple or pernicious anæmia, leucocythæmia in any form, the congestion of hepatic cirrhosis, etc.

3. The anatomy as well as the physiology of the stomach materially affected. In this group comes carcinoma of the stomach, ulcer, or its consequent fibrosis with stenosis of the pylorus, permanent dilatation of the stomach, etc. Here too must be included what I believe to be a very common cause indeed of alleged indigestion, viz., adhesions between the stomach and various other abdominal viscera preventing free peristalsis.

4. The group in which the stomach is, so to speak, the *fons et origo mali*, though even here the nervous system may play a prominent part; for we must put in this group a large number of neurasthenics, some of whom are neurasthenic because they have dyspepsia, and some have dyspepsia because they are neurasthenic—a distinction with a great difference and the cases require very careful separation. This, however, is what may be termed the group of primary indigestions in which diet and habits above sketched play the all-important causative part.

Into one or the other of these groups all "indigestion" must go; and the first difficulty is in putting the patient into his appropriate group, not always such an easy task as might appear. Only a few months ago a case was sent to me in which it was easy enough to see that both heart and stomach were upset, but I was unable to determine which was cause and which effect, and even an autopsy did not clear the matter up. The case is worth recording and was as follows:

Mr. E., æt. 34 years, looked very ill and slight jaundice was apparent. Was well up to about a year ago, then began to lose flesh (three years ago was accepted as a first class life), had no pain but a great deal of indigestion—for which indeed he was sent to me. Vomiting began in August, 1903, and continued for several months; vomited large quantities of frothy stuff; a pain in the stomach gradually appeared of a dull achey character. Questions and examination gave the following: Tongue clean, blown up after food, bowels very regular, abdomen gives very doubtful indications, no splash, no detectible enlargement of the liver—double aortic bruit: he died three weeks later with intense jaundice and much vomiting. The post mortem revealed the stomach and intestines uni-

formly purple to the colon, acute aortitis, heart, lungs, with infarcts, firm spleen and pancreas.

At the time I concluded that the aortitis was secondary to a gastric condition; but the evidence was very inconclusive; there was nothing like ulcerative endocarditis, which was my final ante-mortem diagnosis.

You may say, What has this case got to do with indigestion? The connection is this, that the patient originally called his own trouble "indigestion" and it illustrates the necessity for careful differential diagnosis. Take another case sent to me a few days ago, a woman, Mrs. A., æt. 52 years; had complained for some four months only of "indigestion" but examination soon revealed a lump in the region of the pylorus, and she evidently had pyloric stenosis, probably cancerous; or a third, that of a man æt. about 40 years, a small publican, sent to me in May last with what I took to be alcoholic dyspepsia, but he now has alcoholic dementia and will soon have to go to an asylum.

DIAGNOSIS OF THE GROUPS OF DYSPEPSIAS.

The first point in determining both the fact of indigestion and its causation is a most careful cross-examination into the history of the case. What do you actually complain of that makes you say you have indigestion? (we are rather too ready to accept the patient's diagnosis instead of making one for ourselves) How long have you had these symptoms? are two of the most obvious and important questions to ask. Having got the actual complaints, the next question is, Under what special circumstances do they appear? By that I mean, How soon after food do they come on—at once or in an hour or two, or are they worse just before food? Is the pain real acute pain or merely discomfort? Has the flatulence an unpleasant odour? Are the symptoms constant after every meal? If not, what intervals of freedom are there? Do they come after any particular meal? Do they come on whether the patient sits, stands, works, or walks about? Do they come on in the morning only or at night or all day? Do they wake the patient up in the night? Are you losing flesh or putting it on? If a woman, Are the symptoms aggravated by menstruation? Previous illnesses affecting the alimentary system should be inquired for—dysentery, typhoid, etc.

Questions such as these and others suggested

by the patient's statements may throw much light on the case in many ways; and while they are being asked your eyes should be busy noting the aspect and demeanour of the patient. Is he nervous and full of his trouble, or does he talk rationally about his symptoms? The patient who pulls from his pocket a bundle of notes on every conceivable sensation he has during the day may almost certainly be set down as a neurasthenic.

The family history is of comparatively little use in such cases; but if the patient be a child it may throw some light on special articles disagreeing and it may incidentally also suggest a gouty origin for some cases. Personally I hold the view that the pathology of gout essentially consists in "indigestion," but this is too big a question to be entered upon here.

By the time one has finished this catechism one has probably come very near to a diagnosis; but I must confess that I know of no pathognomonic sign of mere functional disturbance of the process of digestion, but there are certain indications which, especially in combination, are worth a little critical study and these we may deal with *seriatim*.

Age and Sex.—I think that dyspepsia of the genuine variety, *i.e.* without organic foundation, is rarely seen in babies and children under, say, 15 or 16 in an obscure form. By that I mean that as soon as we hear the history we are able to lay our hands on the diagnosis. It is almost invariably the case that the mother makes at once a statement about the diet that throws light on the case, and if she does not the case is probably not one of simple dyspepsia.

When puberty is reached, in girls at least, anæmia becomes at once a very prominent factor, and our difficulties are then not so much in the direction of finding a cause for the indigestion as in making a differential diagnosis between simple dyspepsia and gastric ulcer, though undoubtedly the treatment for one is very much the treatment for the other.

From 25 to 40 is the period when primary (idiopathic, so to call it) dyspepsia is most prevalent, but beyond this one cannot say much, for all the diseases causing secondary gastric disturbances are perhaps equally prevalent.

The tongue.—From time immemorial the tongue has been looked upon as an important organ in the examination of a patient, and it is customary

to look upon it as in great measure the outward and visible sign of the inward condition of the stomach that we cannot see. I have only one statement worthy of your attention to make about it, which is this: if a patient comes to you complaining of symptoms of indigestion but with a natural-looking tongue, this one fact alone should make you suspicious that his indigestion is not simply a purely functional one. Who is there who has not seen a clean tongue with carcinoma, with ulcer, with cirrhotic liver, with gastric crises, with cerebral vomiting, etc.? in all of which diseases dyspepsia is very likely to be the patient's name for his trouble. The converse of this must not be considered to be true for a moment: "Dirty tongue, therefore simply a dirty stomach." There is, to begin with, the dirty tongue of the smoker, which has no necessary connection with the stomach at all; then there is the dirty tongue of the sick patient who is on absolutely slop diet. This is important to remember, because it is apt to be misread with a false impression of the progress of the case; but with these two exceptions, I think it is fair to say that a dirty tongue does indicate a dirty stomach, but not that that dirtiness is all that is the matter.

The appetite.—If the appetite is good, I look upon this as a suspicious circumstance—good, that is, for ordinary articles of plain diet. An appetite for what we may call dainties or extraordinary food is often met with in simple indigestion, but more commonly the appetite for plain food is much impaired. If the appetite be bad, it is quite possible that indigestion may be the whole trouble; it is almost certain that it is present, but it may be only a secondary form of it.

Wind and flatulence.—These are almost constant concomitants of dyspeptic troubles, whether primary or secondary, but if these are secondary they will not be prominent complaints. When they exist with vomiting the case is almost sure to be organic; when alone it may be either. Mrs. A. mentioned above complained bitterly of foul-smelling flatulence.

Vomiting.—In acute gastritis vomiting of a persistent character for three or four days is very likely indeed to be present; but in functional dyspepsia of direct origin my experience leads me to believe that vomiting is quite a rare event. Nausea there may be and even artificially induced

vomiting because of the relief afforded, but of spontaneous vomiting I have had very little experience, provided that there has been no organic mischief present; but when this is present in the shape of morbus cordis, ulcer, etc., vomiting is a common and persistent symptom. How often is tubercular meningitis diagnosed at first as a passing attack of indigestion!

Character of vomit.—Has it ever been coffee-ground? its bulk, its colour, etc.

Pain.—In functional dyspepsia it is not my experience that actual pain is common; discomfort, weight in the "chest," fulness after food, are all common enough, and these may be called "pain after food"; but I wish to urge upon you the importance of analysing the alleged pain of which the patient complains. It will usually, I think, be found to reduce itself down to one of the above modifications. I am of course aware that in a definitely dilated and atonic stomach pain of a very violent character is often complained of, but I am purposely calling this organic rather than functional dyspepsia.

We may get some assistance at diagnosis from the time of onset of the pain after food. In most of the cases requiring diagnosis the alleged pain comes on within half an hour after food; if it does not come on till some two hours or so after food, it may possibly be acid dyspepsia, which, by the way, comes perilously near to an organic form of indigestion.

Another cause of pain which must have a paragraph devoted to it because of its obscurity is adhesions. I have repeatedly, in and out of season, drawn attention to these adhesions as the cause of painful digestion. They occur, as is well known to practical pathologists, with extreme frequency between the stomach, spleen, liver, diaphragm, and intestine in every conceivable combination of these organs and in such degrees as must interfere with the easy working of spleen and stomach. Of all obscure causes for dyspepsia I believe these to be by far the most frequent, and, owing to the difficulty—I might say the impossibility—of diagnosing them, they will remain obscure; but I am certain that they are frequently present, and are acting as the *causa causans* of the "indigestion."

Constipation, diarrhoea, or irregularity of the bowels.—There is nothing pathognomonic of

functional dyspepsia about any of these conditions of the evacuations, but their suggestions vary materially with the age of the patient. In babies and young children, for instance, when a complaint of constipation or looseness of the bowels is made we may and do at once exclude most of the organic troubles mentioned and think only of the food and clothing; this latter is important because cold feet is so closely connected with constipation in young subjects that the cure of the cold feet frequently results in the cure of the constipation.

In youth an attack of diarrhoea compels us to think of the food—unsound or unripe fruit or some indigestible ingesta—but as soon as possible the temperature should be taken to exclude the possibility of typhoid, and the longer the looseness continues the more are we inclined to suspect organic disease. It is as well—in fact, it is essential—that a stool or two should be examined if the condition persists for, say, longer than two or three days. There may be nothing to be found in it, for typhoid stools as seen in general practice are by no means characteristic, and tubercle but rarely affects, in its early stages at any rate, the lower bowel. On the other hand, we may find blood in the stool or melæna (not called blood by the laity) or a great excess of mucus, any of which are nearly conclusive proof that organic disease is present and a careful rectal and abdominal examination must be made; but even now it must be remembered that tubercular peritonitis does not always reveal itself by definite physical signs.

As age advances, diarrhoea, without acknowledged cause or when persistent, becomes of increasing importance as a suggester of organic disease; and by the time fifty is reached a complaint of diarrhoea must be held to necessitate a thorough rectal and pelvic examination, for the paradox that "diarrhoea indicates obstruction" becomes after fifty a very useful working rule. Time after time will such cases prove to be stricture of the rectum, probably, though not certainly, of malignant character.

I have met with one case of rather a different nature that illustrates the importance of examining the stools when diarrhoea is complained of. It was that of a man æt. about 30 years, who came to me on two or three occasions complaining of indigestion and diarrhoea; the most careful examination I could make revealed no cause for either one or

the other, and I was very troubled about the case until a happy inspiration came to me, and I ordered the patient to save all he passed and I would run down and see it. On my arrival I found a long array of utensils, each with a perfectly healthy but large motion in it; this at once cleared up the case, showing that it was one simply of gross over-eating, and only required treatment in the direction of cutting off supplies.

Having finished with this superficial investigation, the patient, as I have already noted, may decline for many reasons to submit to further examination; we cannot consider a diagnosis made under these conditions satisfactory, though it will frequently happen that nothing more will be made out. We must glance at some of the points requiring examination.

The heart I must leave with the hint that bruits are not the only things to be listened for; irregularity of rhythm and a first sound too much like the second in character are even more important than bruits in estimating the cause of "palpitation of the heart," though tobacco and exertion as the possible causes may have already diverted our minds from the idea that the condition of the digestion is the disturbing element.

Pulmonary and pleuritic conditions as possible factors in the case should also be eliminated, though here again I cannot enter into details; early or even advanced phthisis must, however, be mentioned as very potent causes of indigestion, and the former may require considerable care in its detection.

In examining the abdomen for a possible cause of indigestion there is one fatal error against which I am constantly warning students—that is, using a cold hand and using the tips of the fingers for palpation. The abdomen is a region not used to cold exposure nor to the forcible contact of objects of limited surface, and hence it resents such methods of examination and renders them futile by a spasm of the muscles protecting the viscera. The palm of a warm hand must always be used first in palpating the abdomen; the tips of the fingers should only be used when we wish to ascertain the presence or absence of localised tenderness at any particular spot—the epigastrium and McBurney's point, for instance—and then only late in the examination. There is another small point well worth attention, and that is, to put one hand at the back of the patient in the loin and palpate the abdomen

between the hand at the back and the one in front. It is by this means alone that the kidneys, for instance, can be examined and if movable, felt. The importance of movable kidney in "indigestion" is well exemplified by two cases recently sent to me.

The first was a lady, the sister of a doctor, æt. 33 years, troubled for a year with indigestion. The pain began within a few minutes of eating, got worse and worse for several hours; she had never been sick, but often felt so. Her tongue was clean, appetite variable; the least touch on the abdomen caused pain, which was hardly made worse by deeper pressure; the right kidney was very movable. I diagnosed gastric ulcer and put her to bed for a fortnight. She improved but never got well, and came to me four months later as bad as ever. I took her into hospital and Mr. Moullin stitched the loose kidney with simply marvellous results. She lost all her pain and could enjoy life in a way to which she was a stranger.

The second was also a lady, æt. 35 years, who had not had a decent meal for a year on account of pain and vomiting, pain within a few minutes of food rapidly relieved by vomiting. Her tongue was "too clean," no appetite, bowels did not act without medicine. In the abdomen I could find nothing except a very movable right kidney; and as she complained of "a horrible feeling as though something were dragging," and inasmuch as light food caused as much pain as an ordinary diet, I concluded, in the light of the previous case, that the kidney was probably the cause of her trouble, and accordingly it was stitched. The relief was of a most temporary character and she returned to consult me (a year later nearly) as bad as ever, and I fear that ulcer is at the bottom of her dyspepsia and she will probably require a second operation. She has a localised tender spot in the epigastrium.

Beyond these general hints one can only say that every part of the abdomen must be systematically and carefully explored, the patient for the purpose being laid first on the back and then alternately against the right and left sides with the back resting on the knee of the examiner. By this means any tumour should be fairly easily discovered. But a dilated stomach is not always so easy of recognition. One reason for this is that it may be full of retained contents, and consequently its area of resonance diminished instead of

increased; but this dull note itself should rouse suspicions that all is not right, and if it be associated with easily obtained splashing the probabilities of pyloric stenosis are materially increased.

The following are three typical cases of dilated stomach.

S. B., æt. 57 years. Indigestion for eighteen months, no pain, much discomfort, sick after every meal, never free for two consecutive days for over a year. Stomach washed out three months ago, with much relief. Carcinoma found; died in thirty-six hours after operation.

Miss D., æt. 52 years. Periodical attacks of sickness for two or three years, and nearly every day for the last year. Occasionally pain after food, worse till she is sick; much wind. Five years ago hæmatemesis and three years ago peritonitis. Washed out with much relief but died after operation.

F., æt. 54 years. Twelve months ago severe hæmatemesis. Dreadful pain ever since, *relieved by food*! Full of wind, seldom sick. Much splashing. Operation, gastro-jejunostomy. Very much better.

If examination reveals a large liver, do not forget that in clinical practice, whatever may be post-mortem experience, at least two thirds of cirrhotic livers are larger than usual and can be easily felt.

If this systematic examination yields no positive indications, the presumption is that the case is probably one of indigestion only, but such is by no means to be assumed to be certainly the case. Anæmia, depressed spirits, and loss of flesh must all be weighed against the negative evidence and the results of treatment carefully watched, that a repeated examination may be made as soon as practicable.

TREATMENT.

In all diseases, or rather diseased states, we are accustomed to say that rational treatment must consist in discovering the cause and in then removing it; in no illness is this more true than in dyspeptic conditions, and the whole subject might be summed up in the statement: find the cause and remove it. To follow this plan may give us a clue to a rational procedure, and will remove the management of dyspepsia from the haphazard and irrational "soda with gentian or bismuth and HCN." routine treatment of all cases. The

matter, however, cannot be dismissed so summarily, for there are several practical factors that bar the way, which must be mentioned.

We may enumerate the following as a guide to exposition:

- (a) One is unable to fix the disturbing factor.
- (b) The factor cannot be eliminated when ascertained.
- (c) The patient will not eliminate the factor through unbelief.
- (d) Habits or other etiological factors have resulted in organic disease.

(a) *Inability to fix the causative factor.*—This is perhaps the most common cause of ill-success in treatment, but in itself it leads in two opposite directions: (1) we may have to deal with what is in reality a case of grave organic disease beyond our diagnostic eyesight, or (2) it may be difficult to decide which of many probable factors is the most important one.

1. Hidden organic disease. I cannot of course here re-open the whole question of diagnosis of the many organic diseases which may cause symptoms of indigestion; but supposing them to have been eliminated by careful examination, there is one very important line of treatment to be adopted in those cases in which we suspect that obscure (indetectable by ordinary means of diagnosis) local disease of the stomach is present. It is this: put the patient to bed for a few days and watch the effect of a pulpy diet upon the trouble, combining this with our familiar friends Sod. bic. and bismuth. The word "pulpy" requires some little explanation, because in it lies a great deal of the success or otherwise of the treatment. Well, by the term I wish particularly to emphasise the extreme importance of forbidding the patient to take large drinks of plain milk (5 to 8 or 10 ozs. at a time) or to take it similarly diluted with soda-water. This method of feeding sick people is commonly called "slop diet," and that is not what I mean by pulpy; what I do mean is bread and milk, roast apple mixed with a well-baked biscuit, a little well-boiled rice with milk, *stale* bread without butter, milk thickened with a little floury well-cooked potato, a cup of tea with plenty of milk *taken with* a dry biscuit; and I further mean that not more than three ounces in total bulk should be taken at once, and this not more than five or at the outside six times a day. Under a diet like this combined with

absolute rest in bed it is simply extraordinary how "indigestion" will disappear, and especially those forms of it in which we suspect, but are not sure of, the presence of a gastric ulcer; in fact, I will go farther, and say that until a regimen such as this, especially the bed, has been tried for ten days without success the presence of a gastric ulcer can hardly be made certain, and (with the possible exception of very severe hæmatemesis) there is no symptom except this failure in an otherwise obscure case which would justify us in having a laparotomy performed upon a young patient.

As a little additional point in this line of treatment of "indigestion" I may mention a plan I have tried with considerable success in hospital, viz., to give a large dose, 3ss. at least, of bismuth at 10 p.m., 2 a.m., and 6 a.m., allowing no food after 6 p.m. By this means we can guarantee that the bismuth shall have the best chance of reaching and acting upon the coats of the stomach. It can obviously be adopted only when there is a nurse watching through the night.

2. Which is the real factor? When excess of tea at all hours of the day, smoking on an empty stomach, bad teeth, bolting of food, over-eating, over-work and other matters mentioned earlier are all possibly at work, it is often difficult to know which we shall first take objection to. One can only say, try and remove or mitigate the most obvious one first. It requires at times a good deal of questioning to arrive at the most obvious. For instance, a patient was brought under my notice very recently who complained of a bad appetite and indigestion; the cause seemed a puzzle till the patient was asked what she could manage with the bad appetite to eat for breakfast. The reply gave the necessary clue. This reply was: "A mackerel and two new-laid eggs, with the necessary addition of bread and butter." Over-eating was obvious. If "nipping" be suspected, inquiry must be directed to the exact number and times of the potations; many a man indignantly rejects the idea that he is drinking too much until he is brought face to face with and made to realise the total number of drinks he has in the day; the luncheon hour and the hour before the evening train home are the dangerous periods.

As regards smoking (and the same might be said of drinking), it is impossible to lay down any rules as to what amount should be allowed, but if we are satisfied that the given quantity admitted is doing harm, the obvious thing is to diminish or totally suppress the consumption.

Bad teeth can be remedied by visits to the dentist.

The habit of bolting food may in some few cases be overcome by careful perseverance. The late Sir Andrew Clark used to advise his patients to let each tooth have its bite, so that each mouthful was given thirty-two bites. Anyone who tries this plan will be surprised at the ease with which it can be carried out.

It occasionally will happen that the real factor is openly stated by the patient, and then difficulty ceases. I have known two very definite cases of this kind—one, that of a friend of my own, who finds it simply impossible to eat a bit of cheese, of which, by the way, he is very fond. If he does indulge, he gets within a few hours violent indigestion and severe headache; the other was that of a little child for whom milk in any form was simply a poison. Eggs, fruit, and other single articles of diet are more commonly found to disagree.

(b) *Inability to eliminate the exciting cause.*—I cannot of course tell you what to do in these cases, except that a little plain speaking will often prove useful. A statement "If you do not give up now you will *have to* give up later on" may produce an effect when kindly warnings are of no avail. It must be admitted, however, that a serious risk is run here, not only of losing the patient, but of his coming to utter grief. Governesses and the poorer classes of bread-winners constitute a large bulk of such patients. It is in my opinion the faulty cooking of food amongst the labouring classes that is responsible for most of the indigestion met with in hospital out-patient work.

(c) *Disbelief in the cause.* This class is only a modification of the last, looked at from the patient's point of view. It, however, is a very large class, but there is always this hope, that the inexorable logic of established facts and the continuance of the results of persistence may cause a more reasonable frame of mind. The idea expressed in the words "The little I drink, smoke, eat, work, worry, etc., cannot hurt me" is a very prevalent one: the prayer of the Pharisee is not yet omitted from daily use. It is patients of this class that pay the stamp bill for patent medicines and quack nostrums, after asking the advice of several doctors and rejecting the only honest opinions.

(d) *Habits and condition have resulted in organic disease.*—When examination reveals organic disease treatment is of course at once taken out of the region of that of dyspepsia, and becomes that of the discovered ailment. I cannot follow it in these two lectures, but there are still a few hints that some of you may find useful.

Take a dilated stomach, for instance, in which you can feel no pyloric lump. This, I am sure, results mainly from hyperacidity in the first place, with consequent pyloric spasm; and it is very extraordinary the relief you may give by a dose of forty to sixty grains of bicarb. of soda about three hours after food. In several cases patients have

told me that the powders acted like magic in relieving the pain. With such a diagnosis morphia is to be avoided. I am no believer in the "gyromele" for such cases, but washing out the stomach with warm water containing one drachm of Soda bicarb. to the ounce is distinctly helpful, especially combined with a little nux vomica, given before meals.

If the vomit is frothy and contains sarcinae (definite evidence of organic pyloric obstruction), carbolic acid or creasote will be found very useful in alleviating the distress and vomiting, though obviously they are of no use in curing the disease, which can only be done (if at all) by surgical means.

You may ask me, When would you advise surgical procedures? My reply is this: Having made up your own mind that the case is really one of organic stenosis, explain the exact situation to the patient's friends, possibly also to the patient himself, and let them decide the question; but it must always be remembered that delay in such cases means danger of exhaustion; so that the sooner an imperative operation is done the better. I saw, only yesterday, a patient who twelve years ago was operated upon (gastro-jejunostomy) by Sir Frederick Treves, at my instigation: she is still remarkably well.

In *chronic* ulcer of the stomach I feel sure that operation is as necessary as it is in pyloric stenosis for cure; but there is not quite the same urgency about it, and my custom is to inform the patient of the nature of the trouble and then say, "I leave it to you to decide when you will make up your mind to undergo the risks of an operation." These risks are real, though it is no use either to exaggerate or minimise them. Just state them plainly and leave the issue with the patient: this is the more necessary the stronger grounds we have for believing that the cause of the trouble is malignant disease.

For the treatment of a cirrhotic liver I have no new panacea; but I certainly believe that if ascites be present the wiser course is to have a regular laparotomy done rather than to simply evacuate the fluid by tapping. A laparotomy is (1) safer, (2) more scientific, (3) more likely to prevent re-accumulation, and (4) more likely to offer a chance of radical cure should the diagnosis of cirrhotic liver prove (as it may do) to be erroneous.

It is customary in anæmic girls with dyspepsia to avoid iron till the stomach is better. My experience is opposed to the practice, and I find that iron not only improves the anæmia but cures the indigestion.

I fear these remarks on treatment are very fragmentary and incomplete; but I have no specific charm to offer you, and you are as familiar with the routine treatment by bismuth, hydrocyanic acid, and bicarbonate of soda as I am myself.

A SECOND CLINICAL LECTURE ON CASES OF OPERATION FOR APPENDICITIS.*

By G. R. TURNER, F.R.C.S.,
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GENTLEMEN,—To-day I propose to speak in detail of some of the cases mentioned in my previous lecture† on this subject, which may possibly have given rise to difficulties in diagnosis, and cases which may in themselves have features of special interest. Coming, first of all, to the difficulties of diagnosis, I should like to allude to one or two cases, and to say that the diagnosis is difficult, not only because it may be a question as to whether the condition present is appendicitis or something else, but also because sometimes two conditions are present in the same patient. In some of these cases there have been present appendicitis and pyosalpinx, appendicitis and perforated duodenal ulcer, appendicitis and perforated gastric ulcer. The difficulties of diagnosis are perhaps greater in the female than in the male, because of the likelihood of there being present affections of the tubes and ovaries. Only as recently as four days ago there was a case admitted, under my care, of apparent appendicitis. The case was a doubtful one, however, although the history was very clear as to three previous attacks. She was a woman, æt. 21 years, with a clear history of previous appendicitis. In November, 1903, she had acute pain in the right iliac fossa, frequent vomiting for ten days, and constipation. The illness went on for a month, the patient being in bed three weeks. Again, in May, 1904, another attack came on with similar symptoms, and the patient was laid up for another three weeks. The last attack was on October 17th. The pain was very acute; there was much nausea and actual vomiting on one occasion; she had constipation, and was in bed for a week. So that you see there were particulars of three undoubted previous attacks when she came in. This time she had distinct tenderness, chiefly over the iliac fossa. Her temperature was

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up to 102° , she had a pulse varying in rapidity from 88 to 96, and there was a history that she had vomited. A vaginal examination was made, and it was reported that some swelling could be felt in the right of the pelvis. I was a little doubtful as to whether, on this occasion, it was appendicitis, although it seemed certain that she had had previous attacks of this affection, so I determined to watch her for two or three days. Her temperature came down somewhat, but four days after her admission it ran up again to 102° in the evening, remaining at over 100° in the morning. This decided me to operate, but I was so uncertain as to whether it was really appendicitis that I asked Dr. Stabb to see her, and if by any chance it should turn out to be a gynaecological case we settled before I started the operation that Dr. Stabb should complete it. That is to say, I was to make an exploratory incision and examine the appendix, and if the case proved to be a pyosalpinx or other gynaecological condition, Dr. Stabb was to deal with it. On cutting down on to the appendix I found traces of previous attacks. The appendix contained two stercoliths, and was obliterated close to its junction with the cæcum; its cavity was distended with fluid in which were these stercoliths. I removed the appendix, but it was obvious from the condition of it that the acute symptoms were not due to that. On putting my finger into the pelvis I found there were a lot of adhesions and a collection of matter deep seated in the pelvis, probably a pyosalpinx. Dr. Stabb continued the operation, and he removed a suppurating ovary, not only on the right side but on the left side too. This is a good case to bring before you to indicate the difficulties there may be in diagnosis. There was and had been in this case appendicitis, but the girl's symptoms were due to suppuration about the uterine appendages. I may say the left swelling was smaller than the right, and did not reveal itself on vaginal examination. That, then, is one case where there was a difficulty in the diagnosis in a woman. I had another case a little while ago where the symptoms were all referred to the iliac fossa. They were very acute, the temperature was high, and the pulse rapid; there was rigidity and tenderness. I opened the abdomen, not being quite certain that I was going to find anything wrong with the appendix, and I did not find anything the matter with it. But I found an acute

salpingitis with a little free pus in the peritoneal cavity. I removed the right tube and the patient recovered.

With regard to other cases in which there has been a difficulty in the diagnosis, there was one case, referred to in my previous lecture, of a woman *æt.* 39 years. When she was admitted her case resembled in many respects a perforated gastric ulcer. The epigastrium was the seat of the pain rather than the lower part of the belly on the right side. I made an incision and exposed the stomach, and rather to my surprise I found it healthy. It was certain that there was something gravely wrong in the interior of the abdomen; and so, having closed the gastric incision, I then examined the iliac fossa and found there the appendix, which was acutely inflamed and had given rise to all her symptoms. I removed the appendix and she made a good recovery, although acute mania developed during her convalescence.

In another case, the patient being a woman *æt.* 35, the appendix was acutely inflamed and had a stercolith in it, but the ovary also was inflamed and enlarged, and it is important to remember that an enlarged and inflamed ovary may easily give rise to symptoms something like those of acute appendicitis. Two cases where there was some difficulty in diagnosis I will relate to you in detail. One was a case where there was a stercolith and some inflammation of the appendix, and in addition to that there was a *perforated gastric ulcer*. That patient was a man *æt.* 23 years, who was admitted in April of this year. He had had pain in the right side a week. On the morning of his admission there was a sudden acute pain, as if he had been stabbed with a knife, while he was getting into a van, but there was no vomiting. He took brandy and morphia. There was no history of dyspepsia or hæmatemesis. And I may say that in perforated gastric ulcer there very often is no history of hæmatemesis. On admission he walked into the surgery looking very ill. There were tenderness and rigidity over the right side of the abdomen, especially over the right iliac fossa, and also on a level with the umbilicus. The pain was referred to a spot above MacBurney's point. The respiratory movements were catchy, the liver dulness normal. There was much bronchitis, and the evening temperature rose to 103° . The pain was still severe, but there was no vomiting. I ask you to par-

ticularly note that in this case there was no vomiting. As I have said, I am accustomed to pay a good deal of attention, not only to the pain coming on at first, but also to the vomiting in the diagnosis of appendicitis. There was no vomiting in this case, and that fact might possibly have helped us to a correct diagnosis. When I operated ten hours afterwards I decided to examine the appendix, and accordingly I made an incision along the right semilunar line. There was a lot of free fluid but no gas in the peritoneal cavity. The omentum was inflamed, The appendix, which was very long, was lying in quite a little pool of purulent fluid, and contained a stercolith, and so I removed it. But although the appendix contained this stercolith, and was inflamed, I did not think its condition could have accounted for the symptoms, because it was not perforated, and as I thought something had given way, I decided to examine the upper part of the abdomen. I put my finger towards the liver, and found lymph and matted omentum. I then opened the abdomen in the middle line, above the umbilicus, and found a perforated gastric ulcer. I stitched up the ulcer, irrigated the abdomen, made an incision above the pubes to drain the pelvis, introducing large tubes through the incision on the right side, and above the umbilicus. The man made a good recovery. That, then, was a case of perforated gastric ulcer plus an appendix containing a stercolith, the appendix being decidedly, if not acutely, inflamed. The other case was one where there was appendicitis plus a *perforated duodenal ulcer*. This occurred in a man *æt.* 31 years, who for three years previously had been suffering from indigestion. There was no vomiting, no hæmatemesis, no melæna. At midnight on June 20th and 21st of last year, an hour after going to bed, and whilst he was asleep, a sudden sharp pain over the stomach woke him up. It was very acute, but there was no vomiting. The doctor, who was sent for, gave him some tabloids and a purgative, and after taking these he vomited. An enema was administered, but his bowels did not act. The pain continued and he came up to the hospital. He had never previously had any illness, his bowels had always been regularly opened, and there was not much to be said about his previous history. When he came in he was in great pain, flushed, with his tongue furred and dryish. The pulse was 88, and

the temperature 97°. Note that the temperature was subnormal, as of course it constantly is in cases where anything has given way in the abdomen, whether it be stomach, or duodenum, or appendix, or an extra-uterine gestation, or a ruptured pyosalpinx. The abdomen was more or less rigid, and the upper part did not move quite as well as the lower. He had pain at the episternal notch, and tenderness all over the abdomen, but mostly to the right of the middle line, and in the neighbourhood of the bladder, and in the right iliac fossa. The liver dulness was normal; there was no cutaneous hyperæsthesia. There was no definite swelling over the right iliac fossa. The abdomen was retracted, and rather tympanitic on percussion. There was no blue line on the gums, and no Argyll Robertson's pupil. I made an incision first of all through the right semilunar line, and found the peritoneal cavity full of dirty yellow non-odorous fluid. There was no free gas. The appendix was three and a half inches long, there were some adhesions, and it contained two stercoliths. I removed the appendix; but the parts in the neighbourhood were coated with lymph, and it seemed to me there was some mischief beyond that which was connected with the appendix. So once more I made an incision in the middle line, found the liver lower than normal, but the stomach quite normal. But on following the stomach to the duodenum I found a perforation here in its first part, a small circular perforation; bile and free gas escaped when I exposed it. There was no induration around. I closed the perforation with sutures by means of a cleft palate needle, and washed and flushed out the abdomen in the way I am in the habit of doing in these cases of perforated gastric or duodenal ulcers. I put in a tube above the pubes, in the right iliac fossa and above the umbilicus. To put a long story into a few words, I may say that the patient recovered, and left the hospital in about six weeks' time perfectly well. As far as I know, he has had no return of any of his symptoms. This, then, is a case in which there was a combination of perforated duodenal ulcer and an inflamed appendix, containing stercoliths, adherent to the neighbouring parts.

Now another case, one of hæmorrhage into the appendix. The patient, an indoor servant *æt.* 26 years, was admitted into St. George's Hospital on

the afternoon of June 22nd last under my care. He stated that he had been in excellent health until the morning of the day on which he was admitted; at 7 a.m., whilst getting up, he vomited without any obvious reason, and two hours later was suddenly seized with acute pain in the right side. No further vomiting occurred, but the pain continued, and he therefore went to bed; the medical man who was called in to see him gave a hypodermic injection of morphia and advised removal to hospital. As far as the patient knew there was nothing to account for the symptoms; there had been no indiscretions in diet, and the bowels had been acting regularly. There had been similar attacks of pain previously, but of a milder character; excepting for enteric fever in 1901 he had had no previous illnesses. Since childhood, however, he had been subject to attacks of epistaxis, usually lasting about half an hour, and occurring every three or four weeks; he also stated that he always bled more freely than most people when he had been cut or had had teeth extracted. No members of his family, however, had been "bleeders." On admission, he was found to be a rather stout and pale man, sweating freely and in great pain; the tongue was furred, the temperature 98°, and the pulse 120. The abdomen was slightly distended, and there was marked tenderness and rigidity in the right iliac fossa; pain was referred to MacBurney's point; no swelling was palpable. Immediate operation was advised, and the patient was taken to the theatre; on arrival there, however, he insisted on returning to the ward, a course which he afterwards explained as having been due to a "morphia dream." In the evening he gave the necessary consent. Operation was therefore performed at 10 p.m. The abdomen was opened through the lower part of the right semi-lunar line; as soon as the subcutaneous fat was incised several small vessels spurted vigorously, and throughout the operation it was found that bleeding occurred with extraordinary freedom. The appendix was discovered lying behind the cæcum and pointing upwards; it was about three inches in length, embedded in subperitoneal fat, and in close proximity to the bowel; it was slightly swollen, its walls were thickened, and stercoliths were felt in its interior. Its separation was a matter of the greatest difficulty, and so the cæcal end was dealt with first, the

stump being treated by the "cuff" method; the rest of the appendix was then carefully removed and its mesentery ligatured piece by piece. At this point in the operation hæmorrhage was especially troublesome, and a great number of ligatures had to be applied. The abdominal wound was closed with silkworm gut sutures without drainage. On the second day after the operation slight but distinct jaundice developed and lasted about thirty-six hours. Extensive bruising occurred in the neighbourhood of the wound, and a slight discharge of blood escaped from it for twelve days. When the bowels were opened by an enema the motion was dark, but did not obviously contain blood. The patient's recovery was uneventful, and he was discharged from hospital quite well. A careful examination was made of the appendix. On section, it was found to be full of fluid dark blood, and contained three small stercoliths; the mucous membrane was thickly dotted with small hæmorrhages. Dr. Rolleston examined it microscopically, and gave the following report: "There is thickening of the submucous layer due to past catarrhal appendicitis, but no sign of acute inflammation; the mucous membrane shows congested vessels and hæmorrhages into its substance. In other words, there is no appendicitis in the ordinary sense of the term, but hæmorrhage into the appendix. Possibly this is due to some acute toxic or infective process; the incidence of jaundice would fit in with this theory." It should be mentioned that at no time during the course of the case was there any indication of hæmorrhage in any other part of the body. This was a case of what I have called hæmorrhagic appendicitis. It is possible that it was a case of Henoch's purpura—that is to say, a purpura which is attended with symptoms which are sometimes very much like those of acute intestinal obstruction. You will notice that he had what is called "post-operative jaundice." There is an Italian surgeon, Santucci by name, who has pointed out that the grosser kinds of jaundice, after operation, are caused either by pyæmia or by chloroform poisoning. But in addition to those cases due to chloroform and pyæmia, other cases exist in which jaundice follows when the parts within the peritoneum are handled under anæsthesia, and he says that when operations are done without anæsthesia this jaundice is not found. He is inclined to attribute the jaundice

to reflex spasm of the biliary canals. I have seen two cases of post-operative jaundice following ether. In each of these cases there was no vomiting after the anæsthetic.

Leaving these cases, which show some of the difficulties in diagnosis, I will just say a few words about some of the others. I find that one of the most interesting of the cases is, accidentally, not included at all. It was a case which occurred in 1895, and it happens that I have written a record of it in a letter I wrote to Mr. Holmes on the subject at that time. It was that of a little boy, by name Richard, who was in one of the medical wards. He came in with acute appendicitis, perforation, acute peritonitis, with pus all over the peritoneum, and acute pneumonia. He was breathing 60 to the minute, his nostrils were twitching, he had a pulse which one could barely count, and he was as bad as he could be. I opened the abdomen and found the conditions I have already mentioned to you. He eventually recovered. The recovery was of great interest on account of the desperate condition in which he was, but the way in which he recovered was very suggestive of the utility of the modern treatment of peritonitis by purgation. We gave this boy a meat juice, which I need not mention by name, and I fancy we must have given him a bad tin of it. At any rate, every time he had a dose of it his bowels acted, and we found it such an efficient medicine that more was given to him deliberately for the purpose of purgation. Throughout his illness we had no difficulty in moving his bowels. He was a young boy, and his youth was no doubt a great factor in his favour.

There is another somewhat similar case, that of a boy æt. 8 years, who had a gangrenous appendix, with much lymph on the intestines—that is to say, general peritonitis. And he recovered, too. It is my experience that in children, although there may be acute general peritonitis present, the prognosis is not altogether unfavourable. For instance, take the case of a boy æt. 8 years, who had a gangrenous perforated appendix, with a stercolith, and foul purulent fluid in all parts of the peritoneal cavity. That is about as bad a condition as there can be, because the pus was not of an innocent variety such as you sometimes see and was present in a case on which I operated here last night. There was then very foul purulent fluid free in all parts of the peritoneal cavity. With my memory of the case which I have mentioned and that of Richard before me, I thought he might recover in spite of the presence of this foul fluid all over his general peritoneal cavity; and as you know he did

recover. These cases seem to show that children may recover from conditions which would be almost inevitably fatal in the case of adults. I will turn now to a few more cases. One was that of a male æt. 14 years, who had been in two months previously for appendicitis. We thought his appendix was adherent to the bladder. There were enlarged glands and tubercle all over the peritoneum; as a matter of fact he had tubercular peritonitis and appendicitis, with the appendix adherent to the bladder. I want you to note that he had been an in-patient two months previously.

Next, let us consider the case of a female, æt. 17 years, who was an in-patient three months previously. At the operation there was found to be general septic peritonitis and a perforated appendix. She was irrigated and did well. That, therefore, was another case of general septic peritonitis and perforated appendix, which recovered perhaps because the patient was young. You will notice that I irrigated at that operation and to have irrigated at all I must have thought the patient was exceedingly bad. I told you in the previous lecture that I had never irrigated the general peritoneal cavity for the presence of pus unless that pus was all over the cavity, and that I much preferred sponging as a general rule, the danger of irrigation being that you are liable to carry pus to the parts which are not already contaminated by it.

Another case was a male, æt. 18 years, who was an in-patient a year previously to the operation. Many adhesions were found about the appendix. Another was that of a man æt. 26 years, who was admitted because of subacute symptoms. On the evening of May 1st symptoms of perforation occurred. Operation was immediately performed, and fæcal matter was found escaping from the appendix into the neighbouring parts. Here recovered. It so happens that all those cases recovered, but I am not bringing them before you for that reason, but to show the disadvantage of waiting, and this is enforced by many other cases as well. Three of those four cases which I have just mentioned had been in the hospital previously for appendicitis; that is to say, they had had one illness, of which they got well, and later on had to come in again to be operated upon. In the case of the last man I mentioned, that of the man where the appendix absolutely perforated while he was in the hospital, he would have been saved the risk of that perforation if I had operated upon him two days before I did. I regard all these cases, therefore, as arguments in favour of early operation in acute cases.

Now, I want to refer to an acute case, in which the appendix was adherent to the external iliac vein. I would like to say one word about that. At this moment I have two cases in the hospital which I have recently operated upon, and in both

of which the appendix was adherent at the operation to the external iliac vein. One of them I operated upon last night, and I had to deliberately peel it off that vein. Now, it is very curious that although the appendix is so firmly adherent to external iliac vessels, when you find thrombosis following appendicitis the thrombosis occurs nearly always on the left side; not as one might expect on the right side. I think this point has been referred to by other writers on appendicitis. In none of these cases where the appendix has been adherent to the right external iliac vein has there been, in my experience, anything like trouble in connection with the vein afterwards.

A patient, about whom I would like to speak more or less in detail, was admitted in 1901, and was a boy *æt.* 17 years. He came into the hospital with the history of a sudden rather acute pain a week before admission, on the right side of the abdomen. The bowels were costive but opened daily. There was no vomiting. His history was doubtful, and difficult to obtain. The pain in the abdomen seems to have increased, and when he came up he complained, not only of pain in the right lower part of the abdomen, but also in the right ankle and leg. His temperature was 102° ; he had a rapid pulse and looked ill. The abdomen was not distended. There was pain and tenderness in the right iliac fossa, which was rigid and immovable. The rest of the abdomen moved freely and was not tender. No tumour was discovered. I cut down on to the appendix and found it swollen and *œdematous* and very distinctly the seat of inflammation. I therefore ligatured and removed it. In the peritoneal cavity I found a considerable amount of free fluid. This boy had pains in his joints, headache, and swelling of various articulations, obviously, I should think, of a rheumatic nature. These joint inflammations yielded to salicylates of soda and bicarbonate of potash. It was undoubtedly a case of appendicitis, and I do not think I shall be wrong in calling it a case of rheumatic appendicitis. At any rate, its manifestations were accompanied by a certain amount of acute rheumatism.

The next case I want to mention was that of a man *æt.* 22 years, who had a very foul abscess. The appendix was not seen and was not removed. A *stercolith*, however, was found and taken away. This is a case where I feel pretty sure there will be no further trouble, because although the appendix was not removed, the *stercolith* was taken away.

The case of a man *æt.* 20 years, from whom the appendix was removed, is also of some interest. Many adhesions were present, and I daresay there was some pulling at the parts in order to separate them. There was a small pulmonary embolism after the operation. He made a good recovery, but on the day following the operation suddenly became

distressed in his breathing, which was at the rate of 44 to the minute; the pulse was 116 and the temperature 101° . On examination there was found to be tubular breathing in the whole of the lower and middle lobes of the right lung. I may say that the temperature was not that of a pneumonia patient; it very soon became normal, and remained normal, and therefore at the time we thought it to be a case of pulmonary embolism. That I believe was the correct interpretation. There are some operations, especially in which veins are dealt with, in which such pulmonary embolism does occasionally follow. Now and then we see it in this hospital; I have had certainly five or six cases of pulmonary embolism following operations, but I have never had a fatal one. The embolism has caused merely a little temporary distress and pain.

Another case was one in which there was a foul abscess in a youth, *æt.* 17 years. The appendix was not seen at the operation, and the patient was discharged with a sinus. The *stercolith* came away, and the sinus healed. This illustrates the fact that if a sinus persists there is constantly a foreign body, such as a *stercolith*, at the bottom of the trouble. If we had not found the *stercolith* in the abscess in the other case I have just mentioned, there might have been a sinus persisting for a time, as in this one. In another case there was a large retro-cæcal abscess; the appendix was not seen, but the abscess was opened and drained. In these cases in which there is a retro-cæcal abscess it is of the utmost importance that operation should be done early, so that the abscess shall not have the opportunity of running up to the liver and forming an abscess high up in the abdomen. Such an abscess may easily implicate the pleura subsequently and the other contents of the thorax. Cases of that kind are on record, and they are of great interest, but if only they are dealt with early they will have as satisfactory a result as is obtained in any other kind.

I have already referred in my previous lecture to the fatal case that was an instance of abortion following operation, and therefore I will not say much about it now. The patient was six months pregnant and was in a terrible condition, with general peritonitis of a severe degree, and other troubles. Her death took place on the sixth day after the operation. The foetus was a six months' one. Operations, and the giving of *anæsthetics* for the purpose of performing operations, constantly cause abortion. I remember many years ago operating upon the wife of a medical man, who had a sebaceous cyst, not larger than the top of my little finger, in the breast. I removed the cyst, and the wound healed by first intention, and there was no trace of inflammation about it, but she aborted. I did not know she was three months pregnant when I operated. Whether the changes in the blood during the time of *anæsthesia* had any-

thing to do with it I do not know, but it is a fact, which this case well serves to remind you of, that abortion does follow the performance of even slight operations.

Another case was a woman in whom the appendix was densely adherent. It was an acute case, and I dealt with the cæcal end of the appendix first. I would like to say a word or two about this method. I have often found in my operations that when the appendix is densely adherent, when it is very difficult to bring up the tip, that dealing with the cæcal end first enables you to do it comparatively easily. What one does, if the peritoneum is in a condition to allow of it, is to turn back a cuff of peritoneum from the cæcal end, divide the appendix, and then gradually dig out its distal end.

In one instance operation was followed by pneumonia; but I have notes here saying that it was not a septic pneumonia, or from extension upwards from the abdomen, such as one sees probably in a subphrenic abscess. This was a retro-cæcal abscess case, the kind of abscess which does track up to the diaphragm if allowed to do so by surgical procrastination. If you do not operate early, you will find the abscess may burrow. In none of my cases have I done an extra-peritoneal operation from the loin for an abscess which is right outside the peritoneal cavity.

The next case to consider is one of thrombosis, and of the left femoral vein again. It is to be noted that there were several previous attacks. Early operation in the whole of these cases would probably have saved all the subsequent trouble.

Another case is interesting, that of a man æt. 26 years, whose appendix was removed between attacks. It was found to be distended with seropus, and there was an old perforation at the base. This is interesting as showing recovery from perforation followed by obliteration of the canal of the appendix and its distension with sero-pus. I have written here in connection with that case "A nice sleeping dog to let lie!" It is another argument for early operation. A man in that condition is in continual danger.

The case of a man who died on the table at the operation from chloroform I have already spoken about. I would mention that the reason I say he died from chloroform and not from the condition of his appendix is that he had precisely the same symptoms as did two other cases which I have had where there was death from chloroform before any operation had been commenced. I had one such case years ago at Greenwich, the patient being a sailor on whom I was about to perform perineal section. He died before I touched him, from the chloroform which was being given him. Chloroform was the anæsthetic selected by himself; he absolutely refused to take ether, which I consider much the safer anæsthetic. Some time ago here

I was about to operate on a case of strangulated femoral hernia in an old woman, and she died from the chloroform before I touched her; and the symptoms in both those cases were exactly similar to those of this man who died on the table from chloroform. I think it is necessary to make that explanation for putting it down as a death from chloroform.

Finally, I want to say a word about a man who was sent up to hospital moribund, after he had been ill more than six days outside. He was in such a terrible condition that, beyond making an incision and letting out some pus, I did nothing. There escaped, however, from his abscess quite the largest stercolith I have ever seen. It was so large and hard that at first I was not sure whether it was not a case of gall-stone. It was the size of the top of my thumb. I did not know more than that it was a case of acute septic peritonitis which was dying; it might have been that a gall-stone had made its way out of the gall-bladder and caused general septic peritonitis. When you have a patient sent to you who is practically dying—and I am sorry to say we have people sent here in that condition—you must not be too particular in arriving at an exact diagnosis. Your duty is to do what is obviously the best for them and do it quickly. Of course you may in such cases refuse to operate, but I think that is unfair. In spite of the chance of discrediting the operation by increasing the mortality rate, it is the right thing to operate if there is the remotest chance of saving life. I had very little hope when I operated upon this case that he would survive, but I am certain I did right to open his abscess, and so far from hastening his end by so doing I believe I prolonged his life ten or twelve hours.

I have run briefly through, this afternoon, gentlemen, cases which I thought of particular interest. Their narration may have seemed somewhat wearisome to you; but still, when one puts before you certain definite conclusions, it is only right and fair that one should also give the reasons which have led to the formation of those conclusions. The most important conclusion is that it is safest and best for the patient to be operated upon early when he has acute appendicitis. I have shown you also, by the comparatively low mortality—8·8 per cent in the acute and sub-acute cases operated on "during attacks"—that it is not an unsafe procedure. In fact, the mortality is very much less than one has been given to understand would be the case. And, as I have said in my previous lecture, all the cases which have died would have certainly been operated upon even by the most expectant members of the expectant school of surgeons. Remember too that the statistics that I have laid before you are those of a surgeon who operates as soon as he can, but not nearly so soon as he would like.

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SOME OBSERVATIONS ON PUERPERAL INFECTION AND IMMUNITY.*

By AMAND ROUTH, M.D., F.R.C.P.,
Obstetric Physician to Charing Cross Hospital.

GENTLEMEN,—There have been latterly a succession of cases of puerperal fever in Chandos Ward, and this, therefore, seems a fitting occasion to discuss the subject from the two standpoints, causation and treatment.

As regards causation, it is universally recognised that puerperal fever is always due to infection—that is to say, that it is the direct or indirect result of microbic action. It is surgical septicæmia in a puerperal woman, and not a specific disease.

In some cases the patient suffers from sapræmia, or septic intoxication, due to local absorption of toxins or ferments produced by saprophytic or zymogenic micro-organisms, which are found in the genital tract, and which become active in the presence of dead matter.

In other circumstances the lying-in woman suffers from the invasion and multiplication of the pathogenic organisms, such as streptococci, which, whilst freely multiplying in the blood, may take on also a saprophytic action locally. This is septicæmia, but is in reality a mixed form, for sapræmia is usually also present.

The types of puerperal fever vary greatly, and the subject will best be discussed under four heads:

1. The general state of the woman's tissues at the time of infection.
2. The local conditions of the genital tract.
3. The micro-organisms likely to infect the tissues.
4. How can the patient resist infection? Can she acquire immunity?

1. The condition of the tissues, speaking gener-

* A Lecture delivered at Charing Cross Hospital.

ally, are favourable to infection. Nearly all the viscera in the body have just obtained their highest pitch of compensatory hypertrophy to allow of foetal development and are now beginning to rapidly descend the slope of disintegration and atrophy. The blood and other tissues are therefore temporarily full of effete products. The heart, liver, kidneys, and uterus, as well as their adjacent structures, are in process of involuting to their normal size. During this process of disintegration the functions of the excretory organs, including the liver and kidneys, which are themselves diminishing in size, are in excess of the normal, in order that involution may be completed within six weeks. The secretion of milk also throws extra work on the liver, as milk-sugar is formed in that organ. The organs of the body are therefore still working at high pressure, though on somewhat different lines to their functions during pregnancy, and at the same time the blood and other tissues are tending to be overcharged with waste products.

It is obvious under these circumstances that very little extra work would cause a break-down, and this is what actually occurs when either micro-organisms or their toxins suddenly invade the tissues. In parturient women the amount of blood is temporarily in excess, though this is usually remedied by some hæmorrhage during labour. It is more hydræmic than normal; contains relatively fewer red discs and, therefore, less albumen; relatively more white cells and, therefore, more fibrin. This renders the blood more coagulable and encourages the formation of thrombi in the uterine sinuses, and in the veins of and around the uterus.

If infection occur, these vessels are handy receptacles for microbes, permitting them to develop under favourable circumstances, especially if the vessels are thrombosed.

The relative excess of leucocytes in the blood is, however, a resisting power of great value against microbes, as we shall see later.

2. We now come to discuss our second point—the condition of the local tissues. The tissues of the perineum, vagina, and cervix have all been over-stretched, and contain ecchymoses due to torn arterioles. The skin and mucous membrane may be not only abraded but actually torn, readily affording entrance to any infective germs or toxic

elements. The bruised tissues are for the moment toneless and afford no resistance to infection.

Even supposing these tissues to be uninjured, as they may be in multiparæ, there remains an ever-present absorption-area of about fifteen square inches in the uterus, viz. the placental site. Until the third or fourth day, when all these surfaces should be covered with healthy granulation tissue, the danger of infection is obvious.

The vagina contains its own flora, and permits saprogenic organisms to live in its cavity. It is inimical to most pathogenic germs, though they can exist there in a passive state. This vaginal hostility was thought to be due to the presence of the vaginal bacillus of Döderlein, and to the acid products of these microbes, for it is known that staphylococci and other pathogenic germs either die or become inactive if introduced into a normal vagina.

It is probable, however, that other protective agencies are operative in the vagina, such as the absence of free oxygen in the passage, and the action of phagocytes and possibly of alexins.

This vaginal immunity is evidence of the Providence which surrounds the lying-in woman, protecting her from the germs which thrive on the vulva and surrounding parts.

It is a remarkable fact, also, that Nature provides barriers, partly anatomical and partly physiological, against the progress upwards of infective organisms.

The hymeneal orifice protects the infant with gonorrhœal vulvitis from an ascending vaginitis; the external os uteri often prevents an infective vaginitis from reaching the endocervix, and the internal os is often the highest point of a gonorrhœa which may remain latent in the endocervix for months. These barriers, though less marked in the puerperium, are still potential factors. The physiological secretions of the parts limited by these barriers are probably more protective than the anatomical divisions. During labour, provided that no foreign bodies are introduced *per vaginam*, Nature's efforts are *vis à tergo*, and the liquor amnii, foetus, afterbirth, and the hæmorrhage all tend to empty the generative tract of elements of danger.

It is, therefore, not only useless but harmful, in uncomplicated cases, to use vaginal douches either before, during, or after labour.

3. Now we come to our third sub-division, the micro-organisms which are the infecting agents.

Let us first glance at the various micro-organisms which are to be found in or on the human body. It is possible that many of these, which we do not now suspect, such as the moulds and yeasts, are capable of infecting or influencing the well-being of a puerperal woman.

1. *Protozoa*.—These are the lowest forms of animals, and the infusoria, one of their varieties, are found in tertian and quartan malaria and other diseases. Some of these animals require a double host for full sexual development.

2. *Hyphomycetes* or *moulds*.—These are vegetable growths, and occur in parasitic diseases such as thrush, favus, ringworm, and the like.

3. *Blastomycetes* or *yeasts*.—These are best known as producing fermentation, but are the cause also of certain varieties of dermatitis, and Cope in 1899 described a specific form of chronic endocervicitis produced by one of these organisms, and it is therefore possible that such a process might occur after labour.

4. *Streptothrices*.—These organs are plants classed between the moulds and the yeasts on the one hand and bacteria on the other. One of the best known diseases caused by their agency is actinomycosis. Some of the branching forms of bacilli, such as *B. tuberculosis*, *B. diphtheriæ*, are thought by some to belong to this group rather than to Bacteria, under which I have grouped them.

Bacteria.—These are the lowest forms of vegetable life known, and, roughly speaking, are divided into cylindrical or bacilli, spherical or cocci, and the spiral forms.

In all of these bacteria multiplication is by growth followed by division. In bacilli, growth is in the long axis, division in the transverse or short axis. Bacteria are divided into pathogenic and non-pathogenic, according to whether they cause disease or not, but it is known that pathogenic germs—such, for instance, as may be found even in a normal vagina—may lose their virulence and act as saprophytes, only becoming active when in contact with dead tissues, such as the *debris* in the lochia. The toxins of pathogenic germs are different to those of saprogenic, and are usually specific in effect, as in diphtheria. Bacteria are very adaptable to their environment and diet, varying largely in their virulence. Some live on living matter, some on dead. Some cause putrefaction (saprogenic); some produce fermentation

(zymogenic), by which, for instance, starch may be converted into sugar, or albumen into peptones. There is but little essential difference between the processes of putrefaction and fermentation.

Some saprogenic organisms, feeding on dead matter, produce toxins or ptomaines of great virulence, and it seems likely that some of the cases of puerperal sapræmia are of this origin, the toxins being the result of the action of the saprophytes upon the lochia and other waste products of conception. Some of the ferments, too, are toxic, so that some of the zymogenic germs are also toxicogenic.

Almost all require oxygen to live on, acting in various ways upon it; these are called aerobic. A few, such as those of anthrax and tetanus, do not seem to need oxygen and are called anaerobic.

The germs which are most likely to infect a lying-in woman are the following:

Streptococcus pyogenes (a virulent form of which is the cause of erysipelas), *Staphylococcus albus* and *aureus* and *citreus*, *Pneumococcus*, *B. diphtheriæ*, *B. coli communis*, *Gonococci*.

Immunity.—We are now in a position to discuss the question of what can be done to prevent or cure puerperal infection. In other words, how can we get the tissues to resist the germ invasion? or if infected, how can we best get the system to repel further inroads and destroy the invaders and their toxins already in possession?

It will be observed that I am not now dealing with the question of how to prevent germs coming into contact with the patient's tissue. You are all entirely familiar with our system of antiseptics in midwifery. It is this knowledge, put into intelligent practice, which makes cases of sepsis in our own maternity department so rare. That the patients of others are not always equally fortunate our ward bears abundant evidence.

We are asking ourselves to-day, If germs are unfortunately present in the genital tract, how can the patient, by her own natural effort, or with our aid, effectually resist their action?

There are two main varieties of immunity, one of which has been called "natural or innate resistance," the other "acquired or specific immunity."

"Natural resistance" is seen in many ways; for instance, it is that power of living tissue which prevents germs of putrefaction, always present in the bowel and the vagina, for instance, from doing

any harm during normal life. It is that resistance which prevents ferments in the gastric juice from acting upon the coats of the stomach during the life of the individual. It is that resistance which, from other points of view, enables all of us to-day to be immune from the germs which are all around us. Natural resistance, again, is shown by the resistance, in many cases absolute, by which certain species of animals are immune against certain kinds of infection.

Thus, human beings are insusceptible to cattle plague, fowl cholera, or swine erysipelas, whilst animals can resist the micrococcus of gonorrhœa, and are mostly immune to scarlatina, measles, influenza, and so on. Negroes largely resist yellow fever and malaria, but succumb easily to tuberculosis, smallpox, and measles. It appears probable that civilised women are less resistant to septicæmia, in whatever form it comes, than women of savage races who live more natural lives. Young women are less resistant than well-matured women.

"Acquired or specific immunity" is conferred upon an individual by his having had a specific disease, such as smallpox, or by having had a protective inoculation, such as by vaccination, both of which processes protect from another attack of smallpox.

"Natural resistance" to bacteria.—All "natural resistance" in an infected tissue is lost as soon as the tissue dies. Bruising of the tissues lessens their resistance and encourages the development of both pathogenic and non-pathogenic germs. Hence the risk of a very rapid as well as of a difficult or prolonged labour. The intact skin and mucous membrane, and, as a second line of defence, the lymphatic glands retard the penetration of infective agents into the body.

We have seen that the vagina has a natural resisting power, so long as the secretions are acid from the presence of the products of the vaginal bacillus. Organisms may multiply freely in an unhealthy vaginal wound, and yet after a time their multiplication ceases and cure results. Why is this?

It is not merely due to want of suitable food supply, but is due to the action of certain prophylactic processes in the body, phagocytes and alexins. Other methods of resistance, as yet unknown to us, are almost surely present in the body.

Phagocytosis.—Phagocytes, described first by Metschnikoff in 1884, are both wandering and fixed tissue-cells which throw out protoplasmic processes, which envelop both germs and their toxins, and gradually digest them.

If micro-organisms are injected into blood-vessels they are speedily enveloped by phagocytes. If there are few such cells present, a migration of leucocytes occurs, and Büchner has shown that this migration is due to the attraction of the chemical toxins produced by the germs. Certain virulent toxins are repellent to the leucocytes, and migration is then away from the point of invasion instead of to it. In such cases a conservative inflammatory process is not set up, resistance is *nil*, and the infective process continues.

Alexins.—This phagocytic action is not the only power of natural resistance known, for it has been proved that defibrinated blood as well as cell-free serum has a bactericidal power. These bactericidal substances in the body are called alexins, which are soluble acids of a proteid nature and are very unstable. They lose their power if the mineral salts in the blood or serum are removed.

A given quantity of serum can only destroy a certain number of bacteria, so that larger or repeated doses of the infecting agents are dangerous.

In the dead tissues of the lochial *débris* germs may go on multiplying as long as there is any suitable nutrient left. In the living body the resistance to the invasion of the germs or their toxins must after a time cease if the dose is too large or is repeated too often.

It is now known that though the alexins are formed in acellular tissues, they are produced largely from leucocytes, so that the bactericidal action of leucocytes is of a two-fold character, by their phagocytic action and by their formation of alexins. It is uncertain whether living leucocytes can utilise fully the contained alexins. It is probable that alexins are free to act before and after the death of the phagocytes, when the alexins are set free in the blood serum.

Thus it has been experimentally proved that artificially induced exudations are markedly bactericidal, and that this power is proportional to the richness of the exudation in leucocytes. This explains how it is that patients having puerperal fever with local inflammatory exudations are less

likely to have general septicæmia, and are more likely to recover (with or without suppuration).

Now, how can we increase this natural resistance of the tissues?

We have seen that the woman's blood in pregnancy contains relatively larger quantities of leucocytes. Can we increase this by inducing a local or general leucocytosis? If we could do this, we might save many lives; for, if the blood contains an excess of leucocytes (not pathological as in leucocythæmia), it possesses greater bactericidal power.

Many substances have been injected subcutaneously, and are known to cause hyperleucocytosis. Amongst them are organic extracts such as spermin, yeast derivatives such as nuclein and nucleic acid, papayotin, emulsin, diastase, and pilocarpine. Yeast products seem worthy of especial trial. Cinnamic acid, too, excites general hyperleucocytosis. Koch's original tuberculin has very slight specific action, but it induces hyperleucocytosis and in this way is bactericidal.

As bacterial protein is contained in bacterial cells, it is only natural that hyperleucocytosis and increased resistance should be induced by the injection of killed cultures of bacilli. The injection of non-lethal streptococci of erysipelas has rapidly cured patients with anthrax.

It is possible that the injection of antistreptococcic serum in cases of puerperal septicæmia does good by inducing a hyperleucocytosis, rather than by any true antitoxic action. Normal saline infusion encourages hyperleucocytosis, and this may explain its good results in some septic cases.

It is well-nigh impossible with our present knowledge to increase the local "resistance" in puerperal fever, for we have no means to artificially increase the local blood supply, as in a tuberculous joint.

Possibly hot douches, or some form of atmo-kausis might do good in this direction.

"*Acquired or specific immunity*" is that immunity which is conferred upon an individual by having previously had a specific disease, such as smallpox, scarlatina, or syphilis.

This acquired immunity is found to be due to the formation in the tissues of a specific protection against the particular infective agent only, and is not due to a general increase of natural resistance. Specific or acquired immunity may also be arti-

ficially conferred by protective inoculation, whereby the protective substances have to be formed in the body itself, constituting a specific resistance either to the bacteria, or to the toxin, or to both. This can be done in several ways—by inoculation with living virulent virus, as with smallpox, or pleuro-pneumonia of animals; with living but attenuated virus, as in anthrax, or in vaccination for smallpox; or with killed cultures, as in cholera, enteric, or plague.

Acquired immunity may be also artificially produced by the transference of "antitoxin serum," *i.e.* blood-serum of actively immunised animals, containing productive substances already formed. This is used largely in diphtheria, tetanus, etc., in which diseases the antitoxin serum successfully neutralises the toxin in the body, but has no action on the bacilli, which are dealt with by the natural resistance of the body.

We have seen that there are two main types of infective processes—one where the germ multiplies largely in the blood, as in tuberculosis, anthrax, and leprosy; the other, as in tetanus, diphtheria, and Asiatic cholera, where the germ develops mainly at the seat of infection, whilst the toxins affect the whole system. The first is called "pure bacterial infection," the second "toxic bacterial infection." Puerperal septicæmia is usually a mixed form, and as it is merely septicæmia in a puerperal woman does not render the patient immune against similar attacks.

Similarly, erysipelas (also a streptococcic infection), diphtheria, pneumonia, gonorrhœa, tend rather to predispose than to immunise individuals, and it will be noticed that it is one or other of these processes which usually produce puerperal septicæmia.

The majority of cases of puerperal septicæmia are, however, caused by streptococci. Unfortunately, Marmorek's good results with the employment of antistreptococcic serum in human beings both for puerperal fever and erysipelas, published in 1875, have not been obtained by others; and so far no great or uniform success has attended the serum treatment of puerperal septicæmia, and it very rarely happens that the injection of the serum causes such a drop in the temperature and such an improvement in the symptoms as would justify one in concluding that an artificial immunity is being conferred.

The reasons for this failure are many. The serum is obtained from horses which are rendered immune by being subcutaneously inoculated with gradually increasing doses of cultures. It is known, however, that antitoxic serums must be derived from streptococci which originally infected a human being, for serums derived from these germs and from staphylococci found in horses alone are useless for human beings.

There are about forty stocks or varieties of streptococci, and a serum only protects against streptococci of the same stock. Hence the value of polyvalent serums.

To sum up, therefore, we find at present small chance of conferring an acquired immunity in puerperal septicæmia, and must fall back upon any power we may have of increasing the "natural resistance" in the patient.

In addition to local measures, which I am not here considering, we have to keep up the general strength of the patient by every means at our disposal—by administering easily digested foods, alcohol, and nutrient enemata, and by treating symptoms as they arise.

Whether we shall be able to increase this "natural resistance," as suggested earlier in this lecture, by subcutaneous injections of cinnamic acid, spermin, yeast derivatives, saline infusions, etc., is worthy of consideration.

Possibly physiologists may be able to discover a harmless substance which can be injected subcutaneously or into a vein, and which, by artificially producing a temporary hyperleucocytosis, may rapidly increase the "natural resistance" to the extent required.

In Chandos Ward every septic case is at once put on Tinctura ferri perchloridi. How it acts, or where I first became acquainted with its value, I do not know. In some way, possibly by preventing hæmolysis, it increases the resistance of the patient to the septic processes, and has, I believe, saved many lives. It should be given in 20- or 30-drop doses, in water, every two or three hours. It rarely upsets the stomach, and usually cleans the tongue in a marvellous way. No other salt of iron seems able to take its place, for if another salt of iron is substituted, the temperature again rises, and the tongue gets foul.

Although we have had several severe cases in the Chandos and isolation wards during the last

twelve months, only one has died. I give notes of one in the ward now, and of another very severe one who was in the ward in May last.

Another, still in the ward, is having a very hard fight for her life, but she was not admitted till three weeks after labour, having then a large spleen and other evidences of severe constitutional sepsis. It is now the sixth week of her illness, and we still hope to pull her through, though some evidences of septic endocarditis are showing themselves. (She has since died.)

CASE 1 (now in ward).—The patient, E. P—, æt. 24 years, was delivered of her second child on October 2nd, 1904. On October 6th the temperature suddenly rose, and on the 7th after a rigor reached 104.6°. It reached a lower limit next day, 103.2°, but on the 9th October was 105°, and on the 10th 105.6°. She was admitted into Charing Cross Hospital that day, and as the uterus was well involuted no local measures were taken, but Tinct. ferri perchlor., ℥xx, was given in water every three hours. The blood was found to be sterile, but a culture of *Streptococci pyogenes* was obtained from a vaginal swab.

On October 11th the highest temperature was 100.8°, and on the 12th 100°, but on the 13th the patient had another rigor, and the temperature reached 104.4°. Since then the temperature has not exceeded 100°, and she is now (25th) convalescent.

Her child died of erysipelas of the face on the sixth day, after twenty-four hours' illness, tending to confirm the view that her infection was streptococcic in origin.

CASE 2. In Chandos Ward, March 5th to May 29th, 1904.—M. M—, æt. 25 years. Confined of third child on March 1st, 1904. The adherent placenta had to be removed by the doctor. Patient had a severe rigor on March 3rd, and next day the lochia was offensive, temperature 105.5°.

Admitted March 5th. Next morning the uterus was emptied of several bits of putrid placenta, and swabbed out with gauze on a holder soaked with iodine liniment, then douched with iodised water and lightly packed with iodoform gauze. This procedure was followed by a severe rigor, temperature reaching 106.4°, pulse 160. Although the blood was sterile, antistreptococcic serum was injected without any effect. Tinct. ferri perchlor., ℥xv every three hours, was also given, and intra-uterine douches administered daily.

On March 10th the temperature reached $107^{\circ}8'$, and was over 106° on the following day. The temperature dropped to 102° and 103° till April 10th, when it again reached 104° almost daily, with repeated rigors. On May 3rd pneumonia developed in both pulmonary bases, and the physician who saw her considered the case hopeless. The temperature was then 105° . I ordered the iron to be given in doses of thirty drops every two hours, and the temperature became normal next day and the day following. On May 6th she had another rigor, temperature reaching 106° , but after that her temperature hovered about the normal till her discharge, on May 29th.

This was clearly a mixed infection, *sapraemia* and *septicæmia*, with a local partial arrest of the poison.

These observations are fragmentary and imperfect, but may lead you to think, and possibly to discover some efficient way of enabling more of these poor women to "resist" and recover from these terrible attacks of *septicæmia*, sporadic cases of which appear to be as numerous now as they ever were.

WE have received from the "Calorit" Company, of 16, Victoria Street, London, samples of preserved foods which can be heated without fire. The foods are in tins, and any brand may be used. For those people who object to anything tinned the "Calorit" Company provides vessels made of glass. The obvious advantages of this adaptation of the method adopted by builders' workmen for warming their midday meal are secured for the public generally by "jacketing" in "Calorit" patent tins ordinary tins containing food. The outside jacket of tin holds unslaked lime in one compartment and water in another. When wanted for use the tin is placed bottom upwards, and by means of a simple instrument sent with the tin, or by any sharp tool, four holes one and a half inch deep are made at the spots indicated, causing the lime to become slaked. After the tin has been left standing for five minutes it is turned right side up and allowed to stand for another five minutes, shaking it however a few times. The tins are provided with a simple and convenient arrangement for opening, the tongue of a slip of tin round the lid being made to insert into the eye of the instrument supplied for punching the four holes. After winding off the slip of metal the tin is opened with ease and the steaming contents are ready for consumption. The food attains a heat of about 170° F., and the commodities supplied are appetising and nutritious, the samples sent for notice consisting of excellent soups and well-prepared *entrées*.

A CLINICAL LECTURE ON A CASE OF INCIPIENT SPINAL DEGENERATION.

Delivered at St. Bartholomew's Hospital.

By J. A. ORMEROD, M.A., M.D., F.R.C.P.,
Physician to the Hospital and to the National Hospital
for the Paralysed and Epileptic, Queen Square.

GENTLEMEN,—When you consider how slow is the progress and how insidious the beginning of many forms of nervous disease, you will not be surprised to find that many cases present themselves in which a positive diagnosis is not possible; for patients will come to you in an early stage when the symptoms are vague and indeterminate and are not yet corroborated by physical signs, and it may be quite impossible then to decide on the exact nature of the disease. So that, important as early diagnosis may be for the purpose of treatment, yet we often have to wait for further developments before we can make a certain one. The case I am bringing before you to-day seems to be particularly interesting because it is passing out of this phase of obscurity into a second phase in which we begin to see a little light. I think it will be as well first to show you the patient and then to discuss the case. The patient's age is thirty-six; she has had three children and one miscarriage. Except for the facts I shall mention, she has been healthy. She was admitted into the hospital during my absence, and Dr. Morley Fletcher took charge of her for the time being.

Her symptoms may be shortly put thus: she complained of numbness in the hands and feet, which she had noticed since Christmas, 1903, and loss of power in the same parts. This loss of power manifested itself as a difficulty in walking and in using her hands. Objectively nothing normal could be made out, saving that the knee-jerks were exaggerated, that the right grasp was weaker than the left, and that she walked rather unsteadily. She was also suffering from menorrhagia, the result of subinvolution. For this she was transferred to the gynæcological wards under Dr. Griffith. She came back to the medical ward at the end of September, and at that time I went carefully over the case and verified the notes taken on her admission, but could make no positive

diagnosis. Since then, however, there have been further developments. The numbness in the extremities is no worse, but the uselessness of the limbs has increased, so that she can only walk with assistance, and when doing so she drags the left foot. There is a distinct loss of power in the left leg, and she is unable to lift it properly. In the movement of the upper limbs there is some incoordination, but it is not extreme; there is also some tremor. All this might conceivably be due to some "functional" condition; but an examination of the reflexes in the lower limbs points to some definite organic lesion. Thus, you will see that both knee-jerks are exaggerated, and in the weaker leg there is definite ankle-clonus. When we examine the plantar reflexes we obtain Babinski's sign. In a normal person when you irritate the sole of the foot the great toe turns downwards, but in certain abnormal conditions it turns upwards, and that turning upwards is known as Babinski's sign, after the name of the Paris professor who discovered it. That sign is in this case distinct, on both sides. A modification of this sign was discovered by Oppenheim, of Berlin. It is elicited thus: if you draw your fingers firmly down the front of the leg, you may obtain the same extension of the great toe. This sign is also present, as you see. Occasionally there is, she says, an involuntary drawing up of the left leg; such involuntary spasm is sometimes a precursor of permanent rigidity. On the sensory side the only objective defect I have been able to make out is that there is some loss of pain sense—that is to say, inability to detect the sharpness of a pin-prick—in the skin of the right foot and the inner aspect of the right leg. Those are all the positive symptoms which she presents. But on the negative side we have to note that the functions of micturition and defæcation are not affected, there is no muscular wasting and no abnormality in the electrical reactions, nor any affection of the cranial nerves. The pupils act normally, and there is no nystagmus. The vision is normal, except for some old myopia. Mr. Jessop has kindly examined her eyes, and reports that the visual fields are normal, and that there is no optic atrophy.

We will now dismiss the patient and discuss her case when she is gone.

Now, what is the matter with this patient? Are her symptoms due to hysteria? When she was

first in the hospital I think it was impossible to answer that question definitely in the negative.

By hysteria I do not mean sham; I mean a certain abnormal nervous state which is tolerably well recognised but is extremely difficult to define, a state on the basis of which many varied symptoms may arise. Concerning those symptoms we may affirm thus much—that they are always capable of recovery and sometimes of sudden recovery, that they do not as a rule endanger life, and that they are not dependent upon any organic lesion so far as our present means of investigation can carry us. In the early stages of chronic nerve disease this question of hysteria constantly arises, and very often the diagnosis of hysteria is made, if not by the doctor, at least by the relatives. But you should remember that nothing so disgusts and dispirits a woman as to be called hysterical (I suppose because it suggests to her feebleness of mind, or perhaps down-right humbug), and no mistake will recoil upon you more heavily than this if the case eventually turns out to be one of hopeless paralysis. When I first saw this patient, I did not think there were sufficient facts to enable us to decide the question. It is true there were some which made one suspect that her disease was not hysterical. For persistent numbness of all the extremities is not, so far as I know, common in hysteria, at any rate without definite anæsthesia, though definite anæsthesia is very common without numbness. And again, the uselessness of the limbs, although it was not extreme, seemed to be on the whole persistent and progressive. Then there were none of the tender points so common in hysterical women, and of the other multiform symptoms of hysteria she had none. And yet it was to be admitted that there was nothing about her which was absolutely inconsistent with hysteria, because the mere exaggeration of the reflexes could not be held to be diagnostic. The first really definite symptom of organic disease was the appearance of Babinski's sign and of ankle-clonus, both of which I have just shown to you. Babinski's sign is, I think, better called "an extensor plantar reflex," and I shall use that term now. Exaggeration of knee-jerks, ankle-clonus, and extensor plantar reflex, when definite and persistent, all point in the same direction; namely, they indicate disease in the upper motor neuron—that is to say, the cortex of the cerebrum or the

long fibres which pass down from it through the pyramidal tracts and terminate in or near the anterior cells of the cord. I am obliged to say "when definite," because it is sometimes very difficult to say when a knee-jerk is really pathologically increased, and it is sometimes difficult to say whether an extensor plantar reflex or whether ankle-clonus be present or no. Again I am obliged to say "when persistent," because all these things may be the result of certain transient nervous conditions, such as the post-epileptic state, for instance. But if you give these limitations, that the signs be persistent and definite, they may be taken as indications of organic disease interfering with the upper motor neuron. But they point to that with varying degrees of certainty. Exaggeration of the knee-jerk is so common that we cannot lay much stress on that alone. Ankle-clonus when definite and pronounced very rarely occurs in functional disease; some people say never. Extensor plantar reflex is said never to occur in purely functional disease. "Never" and "always" are very dangerous words to use in medicine, but still I think in an uncertain case like this the presence of these signs is quite enough to turn the scale in favour of organic disease.

Now, what organic disease should we suppose she is suffering from? I shall not attempt to go through all the possibilities; I shall only mention one or two which seem probable. She was sent in as a case of peripheral neuritis. Doubtless that disease would produce paræsthesia with loss of power in all four extremities. But against it there is the absence of pain, absence of muscular tenderness, absence of muscular wasting, and absence of any change in the electrical reactions, coupled with the positive signs which I have just mentioned as indicating disease of the upper and not of the lower motor neurons; and so I dismiss peripheral neuritis.

The next possibility is disseminated sclerosis. That is a possibility which we cannot altogether dismiss. We cannot be certain in the early stage of the disease, because the paræsthesia and incomplete paralysis, with increased tendon reflex and the extensor plantar response, are all just what we may see in disseminated sclerosis. But I think there are some points against this diagnosis, namely, persistence of the symptoms, such as they are, without sudden change and without fluctuation; further, the distribution of the numbness, to wit,

in all her four limbs at once; lastly, the absence of other symptoms of disseminated sclerosis, such as nystagmus, intention tremor, and some sphincter trouble. Still, it is possible that the case may eventually turn out to be one of disseminated sclerosis.

There remains one other form of spinal disease which is not widely known and has not found its way into all the text-books yet. I mean the disease which has been described by Dr. Risien Russell, Dr. F. E. Batten, and Dr. Collie, in an article in 'Brain,' vol. xxiii, 1900, under the expressive though somewhat lengthy title "Subacute Combined Degeneration of the Spinal Cord." It is called combined degeneration because post mortem there is found disease both of the lateral and the posterior columns. It is called subacute because, unlike many spinal degenerations, it runs a somewhat rapid course, and usually terminates fatally within a year or two. This danger to life makes it really important that you should know of the existence of this form of spinal degeneration. The course of it seems to fall into three stages. The first is characterised by subjective sensations in the limbs, such as numbness, tingling, pins and needles, coupled with mild paralytic phenomena, partly ataxic in character, and partly paraplegic. The paraplegia is of a spastic type—that is to say, associated with increased tendon reactions and the extensor plantar reflex. I think it not improbable that the patient I have shown you is in the first stage of this disease. In the second stage the patient becomes unable to walk or stand, the spasticity of the limbs increases, marked anæsthesia develops, and spreads from below upwards. In the third stage the paralysed limbs, hitherto spastic, become flaccid, the muscles waste, the knee-jerks disappear, though the plantar reflexes remain of the extensor type. Moreover paralysis of the sphincters now appears, and constitutional symptoms, such as pyrexia and mental changes, and in this general breakdown the patient generally dies. We know very little about the causation of this disease, but it is often associated with severe anæmia. Another of my colleagues at Queen Square Hospital, Dr. James Taylor, drew attention to this fact in the 'Medico-Chirurgical Transactions' for 1895. But even that association is not always found. We know still less of any efficient mode of treatment.

Now, in order that I may not simply repeat the statements of others, I will show specimens from two cases of this disease, with which I have been personally concerned. The first set are from a case I published in our 'Reports' in 1893 under the title "Posterior Lateral Sclerosis." The patient, a woman, had complained for twelve months of tingling in the fingers; this was followed later by tingling in the toes, which spread up the legs. Two months before admission she had lost the power of walking very rapidly; about a fortnight after admission she became unaccountably ill and died. In these sections of the cord (old and imperfect ones, I fear) you can easily see an extensive sclerosis of the posterior columns; in the lateral columns there is disease also, but much more patchy and incomplete. It looks as if this patient had died before the disease reached its full development.

The other specimens are photographs from sections prepared by my friend Dr. Farquhar Buzzard at Queen Square, from a case which was under my care there. You can easily see the disease in the posterior columns, in the pyramidal tracts, and in the ascending cerebellar tracts; in fact, it is a perfect example of combined degeneration of several systems of fibres in the spinal cord. It differs from most of the cases published by my colleagues in that there is no diffuse degeneration in the dorsal region as there generally is, but simply degeneration of tracts. The patient was a man who was markedly anæmic, and for twelve months before admission had had numbness in the fingers, which interfered with his work, and numbness in the knees, causing difficulty in standing. Six weeks before admission his legs failed him rather suddenly, and on admission he could not stand. He had extensive anæsthesia of the lower limbs and retention of urine. The paralysis became slowly worse, and his legs became rigid. About eight months after admission he was suddenly taken very ill, with a rigor, fever, vomiting, and diarrhoea, for which no cause could be found. His legs became flaccid, the knee-jerks, which had been exaggerated, disappeared, and he died in three days, the whole illness having lasted less than two years.

You will see from what I have said that this form of spinal degeneration is really a very terrible disease, and you will understand the grave issues which are involved in the diagnosis of the patient whom I have shown you.

THE DISEASES OF THE TESTICLES OF CHILDREN.

A Post-graduate Lecture delivered at the Hospital for Sick Children, Great Ormond Street.

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GENTLEMEN,—I have selected the diseases of the testicles of children for the subject of this lecture after much consideration.

The diseases, and especially the surgical diseases, of children differ from those of adults in that they affect the future growth and development of the part, and perhaps of the body generally. The more highly the affected portion is to become specialised, the more obvious will be the results of its imperfect attempts to reach full maturity. The testicle fulfils both these conditions, and is *the* gland which we can watch developing from birth to puberty, and further, we can estimate the degree of its perfection by the male characters and the sexual development acquired by the individual. No other gland in the body affords us such an opportunity for study. In the second place, the subject of the various degrees in which adults assume male characters, both primary and secondary, come within the scope of our study; and a great field for scientific work is opened up, in which the busiest practitioner can collect the most facts. Thirdly, the all-important lesson of the diseases of children is taught, that acute inflammation of a developing and more or less embryonic structure leads, partially or completely, to the arrest of its development, anatomically, and, what is more important, physiologically. Throughout life the part affected will be crippled.

There is no need to extend this catalogue; the further reasons will appear as I proceed.

The testicle of the child differs from that of the adult in being in an immature and imperfectly developed condition, both anatomically and physiologically. Furthermore, it has the great advantage for us that we can watch both the development of the gland itself, *i.e.* the anatomical, and also that of the sexual characteristics in the adult, *i.e.* the physiological development. In its life-history the testicle illustrates two great outstanding features of the diseases of children. The first of these is the

influence of disease on growth. Some attention is given to this subject in the ordinary course of instruction in relation to the injuries and diseases of the epiphyses of bones, but the chaos of our knowledge of the action of disease or injury on growth and development is splendidly exemplified by the conflicting accounts which are given in relation to that subject. The second characteristic is the *influence of growth on disease*. Of this, little or nothing is taught. Last February it was strongly insisted on in consideration of the relationship which exists between the herniæ of children and those of adults.* On the whole, a more accurate title for the subject would be the influence of growth on deformity rather than on disease.

I shall deal *seriatim* with both these two natural characteristics of the diseases of children.

The Influence of Disease of the Testis upon the subsequent Growth of the Individual.

Owing to the fact that the testicle of the child remains dormant, growing only with the rest of the body, until puberty, when it takes upon itself rapid growth anatomically and great activity physiologically, we have, in consequence of this late development of marked and obvious properties, an index of the development and the degree of maturity attained by the gland. Thus, there is a better opportunity of obtaining information on the subject of our first proposition, the influence of disease on growth, in this instance, than there is with regard to any other gland in the body. Moreover, the maturation of the testis is needful, not only for the development of spermatozoa (spermatogenesis) to insure the perpetuation of the race, but also for the full acquisition or perfection of the secondary sexual characters, such as the growth of the beard, moustache, the breaking of the voice, the male form of body, etc. It is a great source of scientific interest to the surgeon or physician to note the many and varied relationships which exist between the development of the gland and the acquisition of male plumage. An opportunity exists, in observation of diseases of the testicle, for us to gain knowledge of facts and to add much weighty and valuable evidence to the little known subject of the natural history of the secondary sexual characters.

The first question which arises in the study of the influence of disease upon growth and development must be a consideration of the pathological affections to which the testis of the child is liable. All diseases of the organ are less common in children than in adults, and possibly so as no gland is very liable to the incursion of organisms or inflammation until it is physiologically active. The testis of the child is apparently inactive.

Orchitis is uncommon in the young. In the adult it is not infrequent and arises from gonorrhoea, a disease almost always the indirect result of the maturation of the testis. It is, then, easily understood that the child is largely exempt from it. Cases are seen as occasional sequelæ of the toxæmias of the specific fevers, especially mumps. The production of these may be concerned with the particular action of the particular toxin, such as that of mumps. But they can be regarded otherwise, *i.e.* as inflammation quite irrespective of its cause. This is the only variety of acute orchitis in children with which we are reasonably familiar, and all the reputed peculiarities of this form of orchitis are entirely explicable by the fact that it is acute inflammation in an immature, more or less embryonic and actively developing gland which causes the arrest of the future growth and development in that organ, perhaps leading to its subsequent atrophy. Such an event might be justly likened to a local "post-partum abortion." In the instance under consideration the orchitis is caused by the toxin of the specific fever in the blood. Further, it is to be expected that a poison will cause greater damage on the tender tissues of low resistance which form a developing organ than it will on the tougher and older structures of the adult. In this way the consequent atrophy or imperfect growth of the testis becomes intelligible.

In its clinical features there is no peculiarity of the orchitis of children which distinguishes it from the similar condition of adults whilst in the acute stage. In both, the testis is swollen, hard, hot, and tender, accompanied by a small symptomatic hydrocele and so forth. It is the result produced by the inflammation in a mature or an immature gland, which constitutes the essential difference between the pathology of the child and of the adult. After the orchitis of mumps, it is known that a large percentage of glands undergo

* 'Lancet,' August 20th, 1904.

atrophy. In some instances this atrophy is apparently incomplete—a result probably dependent on two factors, namely, the intensity of the inflammation and the degree of maturity already present. In other words, acute inflammation in an undeveloped gland will cause the arrest of its development, and even the atrophy of those structures which have already been built up. Subacute inflammation may lead only to the dwarfing of its anatomical and physiological growth. Chronic inflammation, fibrosis, or sclerosis, such as results from continued interference with the blood supply, will also, more slowly, but none the less surely, cause imperfect development and growth of the gland. For example, a large hernia, by pressing on the veins returning the blood from the testis, causes hardening and permanent deficient development of the gland, as was seen recently in a boy, æt. 13 months, who had had a large hernia for eleven months. A further degree of venous obstruction is not infrequently seen as the result of the pressure of a truss. Cases of acute, subacute, and chronic orchitis have been seen amongst our out-patients to result from the injudicious application of these instruments. The sequelæ are of vast importance to the child when he grows up, and therefore they cannot be too strongly insisted upon.

In its causation the acute orchitis of children is almost always the result of the action of the toxin of a specific fever or an injury. In the adult, it is almost invariably consequent upon an infective urethritis. But of far greater importance is it to remember that inflammation in the young will interfere with the future development of the gland, wholly or in part, according to its intensity and the degree of development already possessed by the organ. Thus, we see complete and partial atrophy following acute and subacute orchitis. Chronic orchitis, with its accompanying sclerosis, is just as destructive to the future value of the testis. It will thus be seen that inflammation of the testicle of a child is of exceeding importance, and there is reason to be thankful for the rareness of its occurrence. *Epididymitis*, the result of urethral infection in the vas deferens, is common in adults and naturally very rare in children.

All disease of the developing testis is very important. It, therefore, behoves us to consider one of the most common and obvious signs associated with disease of that organ. The common hydro-

cele of children has, amongst others, two important characters: there is a marked thickening of the cord above the hydrocele which extends into the external abdominal ring—a sign easily recognised by comparing the two sides; and secondly, the hydrocele is slacker after the child has been asleep, and gets more tense after the child has been up and playing, a fact due to the existence of a communication between the tunica vaginalis and the peritoneal cavity which allows fluid to percolate from one to the other (Fig. 1, A).

This common form of hydrocele is in reality a *hydrocele in a hernial sac*, a hernial sac being defined as an abnormal pouch of peritoneum in connection with the abdominal cavity. This condition, as was insisted, is due to intra-abdominal troubles associated with the existence of fluid in the peritoneal cavity, and to the presence of a congenital hernial sac. It is not due to the local formation of fluid in the tunica vaginalis round the testis. Treatment must therefore be directed to the abdominal condition, and not to the scrotal.

For practical purposes any other hydrocele in a child is symptomatic of some disease of the testis, or, especially if that organ is imperfectly descended, of torsion of the cord (Fig. 1, B).

The more frequently occurring disease is *tubercle*, which in children shows less tendency to restrict its invasions to the epididymis than in adults. There is but little to add to the ordinary accounts of the treatment of this second class of case. But when regarded in the light of the fact that a comparatively small amount of general inflammation in an immature testis may destroy the whole future value of the gland, it will be obvious that if operative measures are called for, that of orchidectomy or castration is most probably the one demanded; the organ is extirpated, being useless and a danger to the rest of the body. It may be added that the tubercular disease of the testicle seems more frequently to be the primary focus in the young by a great deal than is the case with the adult; so the primary source of infection is removed at the operation.

With regard to *syphilitic disease* of the testicles of children very little is known, and it certainly is an uncommon condition. Cases are seen occasionally of apparent diffuse gummatous infiltration of the body of the testis. Such a condition merely demands medical treatment. But it must be

remembered that these glands will never develop fully.

There is no need to refer to the very occasional occurrence of neoplasm of the testicle of the child. All diseases of the testis of a child, whether due to simple inflammation, sepsis, tubercle, or syphilis, affect the body of the organ, the epididymis alone being very rarely affected.

It will now be seen that the incidence of disease exerts a very profound influence on the testis of the child by interfering with or arresting its future development and rendering the acquisition of perfect male characteristics by the individual an impossibility.

birth, as a natural but belated process. At any rate, the communication between the two serous sacs is found to exist in at least 70 per cent. of cases of imperfectly descended testis. Thus, in about three-quarters of the instances there is a congenital hernia sac. Into this sac viscera may be protruded from the abdomen. As a result of its presence, the internal abdominal ring transmits more structures than is usual and, in consequence, is larger than normal; the inguinal canal soon loses its natural protective valvular mechanism through the enlargement of the internal abdominal ring, and there is every opportunity offered for an increase in size of the hernia.

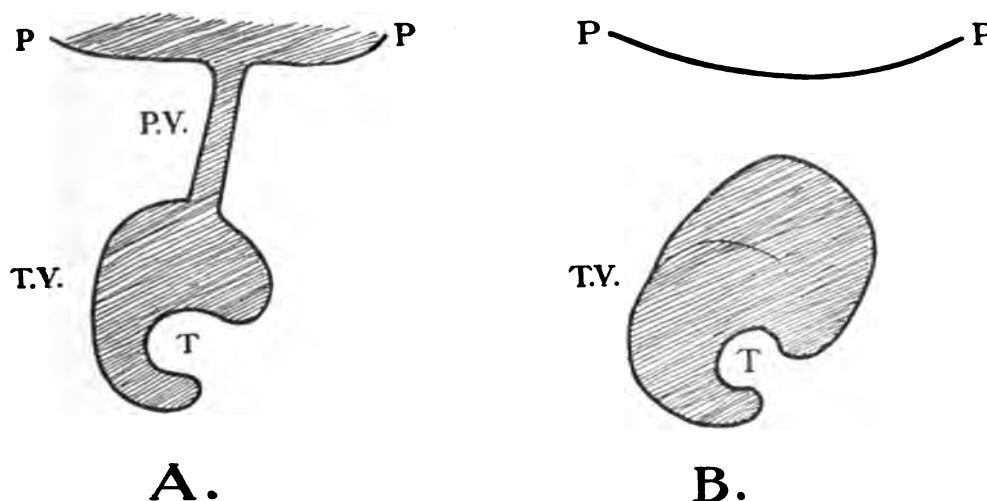


FIG. 1.—A. Common hydrocele of children, with patent processus vaginalis communicating with the peritoneal cavity and the tunica vaginalis. B. Hydrocele of the tunica vaginalis, secondary to disease of the testis. P.P., the peritoneum; P.V., the processus vaginalis; T.V., the tunica vaginalis; T., the testis; the shaded portions represent the fluid of the hydrocele.

The Influence of Growth on Deformity.

The second question we have to discuss is how the presence of deformities concerning the testis and inguinal region are affected by the growth of the child.

To begin with, it must be understood that the condition of imperfectly descended testis, the best-known deformity of this region, is not a simple one. In the normal descent, when the organ has reached the bottom of the scrotum, the tunica vaginalis becomes separated from the peritoneum. But if the gland fails to reach its proper position, remaining imperfectly descended, the division between the tunica vaginalis and the peritoneum does not occur, or, as there is reason to believe, may occur rarely, even after

This reasoning applies to the adult as well as to the child, but in the latter case there is a most important difference. The presence of the testis or hernia in the internal abdominal ring, the inguinal canal, or the external abdominal ring, causes the structures which compose them in their growth and development to perpetuate the deformities to which they are subjected by its presence just as a child which is fixed in a plaster mould would grow into the shape of that mould.

I will now endeavour to make the point of the influence of growth on deformity clear by means of instances more familiar than the one we are considering, namely, the internal abdominal ring and the structures which pass through it. In genu valgum, or knock-knee, we have more than one

illustration. For instance, we are taught that owing to the assumption of the "resting position" of stand-at-ease, the weight of the body passes through the external condyle of the femur and the external tuberosity of the tibia. The result is that those portions of the bone which are subjected to most pressure do not grow as fast as those which are less embarrassed. Hence, the internal condyle of the femur and the internal tuberosity of the tibia grow more quickly than do the corresponding external parts, and the limb is forced into the position of genu valgum. The lesson which this teaches is that if the opportunity offers, natural growth may increase and perpetuate a deformity such as that which has been initiated by the resting position of "stand-at-ease." But it must have that opportunity given to it in order to obtain a start. For the cure of cases of knock-knee surgeons perform an exceedingly efficacious but inartistic operation, called a Macewen's osteotomy. The femur is divided just above the condyles and the leg is put straight. The fragments of the femur above and below the line of section are necessarily placed at an angle, and unite, forming an angular union. Professor Howard Marsh, in his "Hunterian Oration," showed us clearly that Nature in her kindly mood causes growth to cover over and smooth off the gross and ugly handiwork of the surgeon, in the course of time reproducing a femur which scarcely shows the imprint of his "cloven hoof."

Again, in the lateral curvatures of the spine, so commonly seen in growing girls, the bodies of the vertebræ are apt to become wedge-shape. Those portions of the vertebræ which are situated on the concavity of the curve are subjected to more pressure than those on the convexity, consequently growing less quickly. In this way the peculiar wedge-shaped vertebræ are produced. This is another example of the accentuation and perpetuation of a deformity by natural growth.

We will now go on with the important subject of the correction of the deformity by growth, one example of which is the growth of the femur, after it has been divided for the relief of genu valgum, concealing the angular union which of necessity results from the operation. In this way the deformity intentionally produced by the surgeon is completely corrected.

Growth takes place, as Professor Marsh has said, along two chief lines, the one *growth by type* and

the second *growth by function*—that is to say, anatomical and physiological growths. By means of the first we become human beings and not elephants. By means of the second we grow according to our methods of living, as is seen in the under-fed and over-worked clerk of a busy city and the sturdy backwoodsman of our colonies. Now, a rickety child develops the curvatures of its limbs by walking or crawling—that is to say, on account of the functions which its limbs perform. Keep the child off its legs, treat the rickets, and through the agency of growth by type, which now acts alone, the curved limbs will become straight, or at least straighter.

It will now be seen that natural growth does one of two things: either it accentuates and perpetuates the deformities or it corrects them, according to the conditions under which it works. But it cannot originate them. Let this be applied to the inguinal region, and the same lessons may be read there. But they are only revealed on the operating-table, and hence the extreme slowness of their interpretation and the diffusion of knowledge. In the theatre, the results can be demonstrated again and again. The internal abdominal ring, the inguinal canal, and the external oblique, become large and lax. The increased size of the internal abdominal ring does most to abolish that beautiful protective valvular mechanism of the inguinal canal of the healthy individual. Every invitation is offered for the protrusion of abdominal viscera to further magnify the deformity.

We have seen that growth tends to perpetuate the deformities so long as they are present and functional, *i.e.* are actively and usefully present. But we have also seen that if the active cause of this presence is removed, say by operation, then growth tends to improve upon and perpetuate the work of the surgeon. We can now see the great importance of calling in the aid of surgery to remove the deformity and prevent growth doing more harm than it has already done, and to turn its use to the improvement instead of the depreciation of the value of the part. In fact, at no time in the whole course of life have operations for such conditions a better prognosis than they have in the growing child. And surgeons who operate on children must acknowledge that they have no better friend than the subsequent healthy, natural growth of the part. All that I have said applies

with equal force to the imperfectly descended testis and the inguinal region in general.

I must now mention a few particulars which illustrate how the inguinal canal becomes deformed.

To begin with, where there is an obvious protrusion of abdominal contents—that is to say, a hernia—the more widely will the inguinal canal be dilated, and the more deformity will there be present to be commemorated by growth. Again, the presence of a *hydrocele* will act in a similar way, and will offer the additional spur for the need of operation, in that some torsion of the spermatic cord may have given rise to it. Yet, again, let me lay stress upon the imperfectly descended testis which slips in and out the external abdominal ring, so preventing the formation

advisable as comparisons must be made between the boyish and the manly characters, and not between male and female, as is the idea naturally conjured up by the phrase “secondary sexual characters.”

By “primary sexual characters” are meant the plain and obvious anatomical distinctions which exist between the male and female generative organs. By “secondary sexual characters” are meant the host of heterogeneous differences which are found between the male and female, anatomically, physiologically, psychologically, and in any other way. This classification into primary and secondary sexual characters is absolutely arbitrary and unscientific. By the latter are understood all the differences between the sexes other than those in the genitalia. The secondary sexual characters

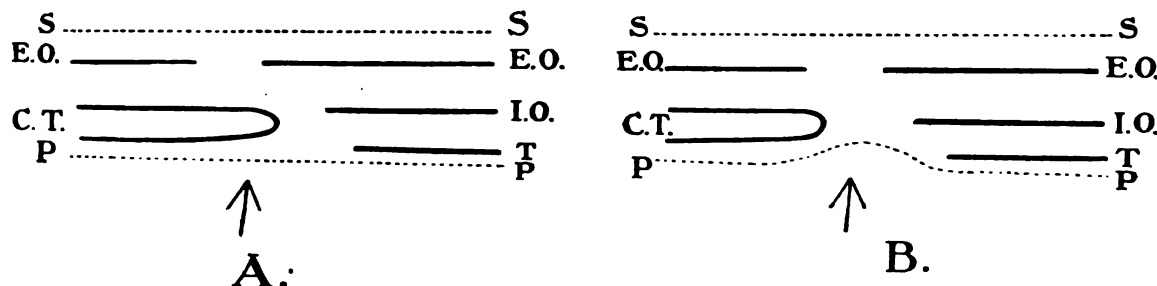


FIG. 2.—A. Diagram of section of the healthy vaginal canal. Note that the edge of the conjoined tendon (C.T.) overlaps the external pillar of the external abdominal ring. A valvular mechanism is thus established. B. Similar section, but in this the internal abdominal ring has become larger and the valvular mechanism seen in A is abolished.

The arrow indicates the direction of the intra-abdominal pressure; E.O., external oblique muscle; I.O., internal oblique; T., the transversalis; C.T., the conjoined tendon; S.S., skin; P.P., the peritoneum.

of the protective valvular mechanism seen in the inguinal canal of the perfect and healthy individual. The condition is often found, and with it is always felt an external abdominal ring which is markedly larger than that on the other side—an admirable lesson indicating the dilating process present, and emphasising the fact that natural growth perpetuates and increases the deformity, which, in this case, is present also in the internal abdominal ring, the process of perpetuation lasting just so long as the predisposing conditions are allowed to remain, and as long as growth takes place.

The Secondary Sexual Characters of the Male.

I have already referred to the secondary sexual characters, and it seems advisable that we should consider them more fully. This is especially

of a man, being visible and obvious, naturally have become the distinctive every-day features of the male, just as the corresponding properties to the female have become the ordinarily recognised attributes of that sex.

It is with regard to the connection between the testes and these manly features with which we are concerned. In a lecture * which I delivered here last year I showed that these so-called secondary characters existed before the primary generative glands themselves were physiologically active. They therefore originate apparently independently of what we in our ignorance call the primary sexual gland, or distinctive sexual feature. Thus, male babies present certain differences from female

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babies; boys before puberty can be distinguished from girls. But for the full and perfect acquirement of the male distinctions full development and maturation of the testes are requisite. On the other hand, imperfections of the masculine distinctions may be due, not only to imperfect development of the testes, but also to some failure on the part of the antecedent unknown activity which led to the formation of the male generative glands themselves. Thus, in the case of the imperfectly descended testis, there is the imperfection of the gland consequent upon the same cause which led to its failure to descend fully into the scrotum. This is an example of a more or less general or *constitutional* failure, usually associated with deformity, such as imperfect descent. But when disease arrests the growth and maturation of the testis alone, the defect is *local*, and the results are dependent on the non-production of an "internal secretion," the importance of whose action on the individual is of the greatest and cannot be too strongly urged upon your attention.

Everything which leads to failure or arrest of the development of one or both testes will cause some corresponding defect in the acquisition of male attributes. The most general and obvious of these is the delay in the occurrence of puberty, that epoch of transition from the boy to the man. In consequence, the boyish face and figure are prolonged so that the announcement of his age creates astonishment. With this prolongation of the period of puerility are other marks or stigmata of the immature. For instance, the voice, which should "break" at puberty, may not do so, remaining high pitched or treble, and male sopranos and altos result. There are great variations or amplitude in the extent to which the voice may break normally—that is to say, within the physiological limits of an adult male, as from the highest of boyish trebles the deepest of adult bases may come. Likewise, there is great variety in the abnormal occurrence. And I would desire to attract attention to one of the least noticeable of these. The speaking voice is male, *i.e.*, tenor, baritone, or bass, but the singing voice remains largely unbroken and high pitched. The contrast between the singing and speaking voices of some individuals is extremely marked. Great care must be taken before it is justifiable to argue from the character of the voice that there is male deficiency. In

most cases other and concurrent stigmata must be found. Another example is the late and deficient growth of hair on the face, the beard and moustache. In estimating this, the natural disposition of the individual must be considered. For instance, his kith and kin may be all of them sparse in the growth of hair on their faces. Again, some races and peoples, such as the red races, show but a scanty growth. The modern fashion of shaving both the upper lip and the chin to some extent masks the true condition, not only by rendering the hair imperceptible, but also by strengthening its growth. The actual texture of the hair seems more a racial than a sexual character.

Combined with testicular deficiency is often seen a fat, boyish type of body and face. The thin, pale, and emaciated type of testicular deficiency is found amongst those in whom that deficiency is constitutional or congenital, and not due to some acquired local disease or deformation. But on this point, and the final sexual characters as seen in the anatomy, physiology, and psychology, etc., of the individual, the normal man is too prodigal of variation for any note to be made of them here.

Finally, to sum up, testicular disease in a child will result in the prolongation of one or all of the characters of the boy into that period of life when the man and the adult male plumage should be present.

[I must add a few words to try and meet the most frequent criticism which the above has called forth. In the more accepted views on the subject, the power and capacity for sexual gratification is regarded as a function of the testicles. Without entering into the subject, it may be stated that to a certain extent this is true. But of far greater importance in this connection is the action of the mind and the education, or, as they may be called, of the psychological factors. Again, there is no interdependence between sexual power and sexual fertility. Immature sexual development does not abolish the former, though, according to its degree, it will the latter.]

GLAESSNER resected a long piece of the intestine in dogs, reversed it, and sutured it again in place. The fæces were not passed along in this stretch of the gut, and severe obstipation was the result. The nitrogenous elements in the urine increased progressively.—*Journ. A. M. A.*, vol. xliii, No. 26.

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A CLINICAL LECTURE

ON

SOME POINTS RELATING TO GROWTHS OF THE STOMACH.

Delivered at St. George's Hospital.

By SIR WILLIAM BENNETT, K.C.V.O.,
F.R.C.S.,

Senior Surgeon to the Hospital.

GENTLEMEN,—There is a man in Fitzwilliam Ward, upon whom I operated a week ago, who came into the hospital with a history of having for a long time suffered from symptoms of indigestion, which latterly had culminated in attacks of acute pain, coming on not very long after taking food and causing a great deal of distress, but not giving rise to vomiting, nor to any difficulty in swallowing, or anything of that kind, so far as the man himself knew. He, however, complained of certain symptoms of discomfort about the lower part of the throat, which led to his being examined for the possibility of a stricture—probably malignant disease of the œsophagus. On attempting to introduce a bougie into the stomach it was found that it stopped short at a certain point, apparently quite low down in the gullet; so it was thought at first by those who sent the man for admission that he was suffering from malignant disease, and that the case was probably one in which the operation of gastrostomy would have to be considered. However, upon carefully investigating the case, I could find no evidence of any obstruction in the gullet, and I came to the conclusion that the cause of the symptoms was carcinoma of the stomach itself. The case is very instructive from two or three points of view; because, although at the time of the operation which was subsequently performed we found a large growth of the stomach, evidently malignant, yet before the patient was placed on the operating-table we were entirely unable to detect any tumour.

We examined him in the ward, under an anæsthetic, but could feel no tumour nor any other objective sign of growth. Nevertheless, I felt sure that a growth existed, and expressed an opinion to that effect. Those of you who were present while we were talking about the case will recollect that, in addition to the other symptoms mentioned, I based my diagnosis upon two main points. The first of these was the existence of a tender spot just to the left side of the middle line, below the ribs, associated with a certain amount of protective rigidity in the abdominal muscles. The second was a peculiar catch in the action of the upper segment of the abdominal muscles at the end of a deep respiration. On breathing deeply, instead of the usual rhythmical action of the abdominal muscles, there was apparent at the end of expiration a peculiar upward catch, affecting the upper segment of the abdomen, which I have seen only in the abdominal wall of persons afflicted with some form of growth or mass involving the stomach. Under those circumstances, as I have said, I ventured to diagnose the existence of this tumour which we saw at the operation, but which we could not feel before. Not only did the tumour exist, but it was so large, and involved so much of the stomach, that it extended from the extreme cardiac end to the pylorus. Indeed, so little of the stomach was left free from this mass of disease that I could find no part in which I could make an anastomosis with any safety, because had I done so the opening would have been involved in the disease, and the object of the operation would have been, of course, nullified. Therefore, as I could not in any way see how I could afford relief by operation, I simply closed the abdomen, leaving the case to take its course. That is an excellent example of the existence of a large growth in the stomach, probably originating in the neighbourhood of the small curvature, which could not be detected by manipulation even when the patient had been anæsthetised, in consequence of its lying so high up under cover of the ribs, where it was immovably fixed by adhesion to the parts behind. There is one point, in passing, which is worth your attention, in connection with the behaviour of this patient under the anæsthetic. It is a practical point, which may be of use in connection with the examination of any patient's abdomen under an anæsthetic if you wish to get

useful information. It was extremely difficult, as it often is in such cases, to get the abdominal walls properly relaxed; and in point of fact, although a skilled anæsthetist was giving the anæsthetic, it was not found possible to do so. So that, although my examination of the patient was as complete as I could make it under the circumstances, it was not as complete as it should have been during the administration of the anæsthetic, in consequence of this failure to produce complete relaxation of the abdominal muscles.

You will readily understand from what I have said that this was in no way due to the anæsthetist or to the particular anæsthetic used, but to a peculiarity sometimes found in patients suffering from disease in the upper part of the abdominal cavity. An important and very practical point about this matter is the following: Although there may be this difficulty in getting relaxation of the muscles during anæsthesia, it is a singular fact that *just after the administration of the anæsthetic has been left off and the patient is on the point of becoming more or less conscious, then for a period, perhaps of a couple of minutes, complete relaxation takes place*, which is in marked contrast to the comparative rigidity which has existed up to that point. In these cases, therefore, if there is a difficulty in making a thorough examination under an anæsthetic, in consequence of muscular rigidity, always be sure, before giving up your examination altogether, to wait until the patient is just beginning to come round, and then make a further examination, because you will often find at that period that the abdominal muscles, no matter how obstinate they may previously have been, are completely relaxed.

It is sometimes said that the obtaining of relaxation of the abdominal muscles is merely a matter of skill and experience on the part of the anæsthetist—and this doubtless as a rule is true; but at the same time I have seen very experienced anæsthetists fail to obtain complete relaxation. In all of such cases complete relaxation has for a period come on just at the time when the patient should under ordinary circumstances be coming round from the anæsthetic.

Returning from this digression: the case which I have described is an example of acute gastric symptoms arising from a growth of the stomach which could not be felt before the operation.

For clinical purposes you may arrange growths of the stomach under three heads: (1) those, like the case in question, where symptoms are present without perceptible tumour; (2) those in which a large tumour exists, involving the stomach, which give rise to no symptoms whatever, the tumour, in fact, being the first thing noticed; and (3) those in which an intermediate condition exists, acute symptoms co-existing with perceptible tumour.

These, you see, are three distinct types. The facility with which a tumour of the stomach is felt in an ordinary abdomen will depend to a great extent upon its position with regard to the arch of the ribs and the diaphragm. The higher up the tumour is; the more it is tucked up under the diaphragm; and the more it becomes fixed by adhesions, the less likely are you to be able to feel it. In some patients a tumour in this situation is altogether imperceptible to palpation. A large abdominal tumour may exist lower down involving the stomach without giving rise to any gastric symptoms worth mentioning, whereas a smaller tumour, which at first sight you would imagine was a matter of comparatively small importance, may be associated with the greatest possible distress. Now, the difference in the two cases—that is, the one in which there is a large tumour without material symptoms, and the other in which there is a small tumour with very distressing symptoms—will depend mainly on this point: no matter how large a tumour is, if the surface presenting towards the inside of the stomach is not broken down or “raw,” there is no inherent reason why the tumour itself should give rise to trouble unless it causes obstruction. On the other hand, however small the tumour may be, if toward the gastric aspect it is raw, ulcerated or breaking down, it is naturally sensitive, and pain is a necessary consequence, especially after taking food. The amount of pain will vary in different cases, the difference being mainly dependent upon three points: the occurrence of obstruction, the amount of breaking down, and the situation of the growth—growths (in the absence of obstruction) affecting the small curvature and its neighbourhood being more painful than those limited to the greater curvature and fundus. The size of a growth does not necessarily bear any relation to the degree of distress suffered by the patient: indeed, those tumours which are least obvious to the touch and to the sight are

frequently those which give rise to the greatest pain. The reason of this is that these out-of-sight and out-of-touch tumours as a rule commence to grow along the small curvature of the stomach; they are high up and grow as a rule quickly, generally involving, soon or late, the cardiac orifice, so that everything which passes into the stomach crosses the raw or broken-down surfaces and so naturally produces distress. Tumours reaching the cardiac orifice are also interesting from another point of view, because they sometimes, as occurred in the case under notice now, give rise to the idea that the patient is suffering, not from carcinoma or other malignant disease of the stomach, but from some disease of the gullet; as when these masses grow thickly, as they often do, around the cardiac orifice of the stomach, they form an obstacle at a certain point to the passage of a bougie, and may therefore lead an inexperienced practitioner to attribute the stoppage of the bougie to an obstruction in the gullet—an error which may be of great importance from the point of view of treatment.

Here is a case illustrating another interesting point in connection with some of these tumours, especially the larger ones, about the stomach. A few months ago there was a woman in Winchester Ward who had a very obvious tumour, clearly involving the pylorus and the parts of the stomach immediately about it. The stomach was dilated; she suffered from pain after taking food; there was frequent vomiting; she had, in fact, all the symptoms of a person suffering from pyloric cancer. It was clear that her life could not be much prolonged, as she was being starved by the inability to retain food, unless an operation for the removal of the growth, or failing that, for gastro-enterostomy, could be carried through. Upon exploration malignant disease was found involving the right half of the stomach adherent to the under-surface of the liver, and some other parts, associated with a large number of nodules, apparently of malignant disease, lying around at a considerable distance. The disease had even gone so far that there were isolated nodules of disease on the peritoneum of the anterior abdominal parietes. The case, in fact, seemed as hopeless as it could well be so far as any permanent benefit was concerned. There was, however, sufficient of the stomach left free from disease to enable an

anastomosis to be made between it and the nearest piece of normal small intestine. I therefore did this, hoping to relieve the distress of vomiting and pain during the short time which seemed likely to be left of her life. There was nothing else to do : it was clear that no attempt at resecting the stomach could be considered, because the collateral deposits of malignant disease, as they appeared, were so very extensive. No unfavourable symptom followed the operation, the patient soon began to put on flesh, and from being nothing better than a bag of bones, in a month or so she was in a comfortable looking condition. In other words, she looked quite a changed woman. But the most interesting point about the case was this : by the end of a month after the operation it was almost impossible to feel anything of this tumour at all through the abdominal wall ; as a matter of fact it had disappeared, so far as palpation was concerned, except a small nodule, which could only be felt with difficulty. All this disease, which appeared to be clearly malignant, had gone with the exception of the small nodule which I have mentioned. She has been seen since then (three months after the operation) ; there is absolutely nothing to be found. She is rapidly gaining flesh, looking healthy, her digestion has gone on comfortably ; she has no distension, no vomiting, no dilatation, and nothing abnormal of any sort is perceptible through the abdominal parietes. Yet at the time of the operation the tumour was as large as a cricket-ball, and projected so that it could not only be felt but could be seen. The case was one of those occasionally met with in abdominal surgery of tumours which whilst they appear to be hopelessly malignant, disappear after exposure and handling in the course of an operation of this sort. These disappearing tumours are not so very uncommon. There is a man who comes to the hospital from time to time now who was one of the first, if not actually the first, case of gastro-enterostomy performed in this country, and the first done in this hospital. He had a precisely similar condition to that of this woman. I remember the particulars of his case quite well. There was a large mass of the size of my fist involving the pyloric end of the stomach with what appeared to be secondary deposits about the abdominal wall. At the time I was dissuaded from doing anything more than closing the wound on account of the numerous secondary deposits ; but as there

was this mass and I thought I could make an opening into the stomach on the cardiac side, and anastomose it with the small intestine, I did that, with the result that the patient did well and he is alive at present, following the occupation of a waiter, which is not, perhaps, the best occupation for a person in his circumstances. He is still without any sign of the tumour which existed at that time. It is clear that these tumours cannot be malignant ; they must be of an inflammatory nature, probably occurring about an old gastric ulcer, or something of that sort. These cases have a very definite bearing on surgical practice, and the bearing is this : no matter how grave the aspect of a case is, so far as the existence of any tumour is concerned, when it is associated with the stomach or with any of the abdominal viscera, you should not, unless the patient is obviously *in extremis*, give up all hope of recovery, because in some cases these tumours disappear after exploration. Further, this occasional behaviour of these conditions has a practical relation to certain very extensive operations. For example, I think it is possible, in spite of the large amount of secondary nodules, or apparently secondary nodules, which existed in the man's case which I have mentioned, that some people would have proceeded to remove the stomach and as much of the disease as could be got away with it. Supposing that the patient had recovered it would have been a most excellent case, no doubt ; but in such operations the mortality is high, and the patient has clearly done quite as well without, because the disease, you see, has disappeared. This disappearance of masses in the abdomen is very curious, but the fact that they do sometimes disappear makes some cases less hopeless than at first sight you might suppose them to be. Take, for example, the man whose case is described at the beginning of this lecture. Although there was a large mass, I should be disinclined to give up all hopes until I knew that something had happened to him, except for this one reason, and it is a practical one : The tumours which disappear, so far as I know, are almost always associated—I am now speaking only of those involving the stomach—with the large curvature of that organ. I have not yet seen a tumour disappear which was more particularly confined to the small curvature, as it was in this man. For that reason I do not feel very hopeful about him. But still, I would say:

never give up a case as hopeless until death has actually occurred, or unless it is actually imminent. That is an attitude which is not only good from your point of view, but it is also encouraging to the patient. Nothing is worse, speaking generally, than to let a patient know that his case is hopeless. I have seen patients commence to die almost at once upon being led to feel that it is useless fighting against their disease; I think therefore that the attitude of hopefulness is as sound as it is kind.

In the cases of gastric disease of the type of which we have been speaking the question arises;—after the exposure of the stomach, what is the proper course to pursue? In certain cases you may find it justifiable to remove the stomach, but such a contingency must be of the rarest. I have only seen one case, and I do not think I am likely to see another; because as a matter of fact in all these cases when the disease is so extensive that it cannot be removed without extirpating the whole organ the secondary deposits are altogether too extensive in my experience to make local extirpation anything more than a mere academic exhibition.

For practical purposes therefore the question resolves itself into resection of the growth from the stomach or the performance of gastro-enterostomy, the latter being the commoner course if prudence is to count for anything.

The amount of relief and comfort which the patients get by the direct and unobstructed passage of food from the stomach into the intestine through the artificial opening is very great (even if the disease has left the pylorus quite free) in consequence of the absence of sphincter power; the opening in gastro-enterostomy being quite passive, the contents of the stomach flow through it without any of the frequent interruptions which arise in connection with a sphincter. It has been held by some people that by arranging the fibres of the small intestine in relation to the fibres of the stomach in a certain manner a definite sphincter action can be produced; but if this is possible it is very doubtful whether it is desirable. The main point in a gastro-enterostomy is to make an opening large enough to allow a free passage for the contents of the stomach from that viscus into the small intestine without any obstacle in the way of muscular contraction or what not. The opening may be made on the front of the stomach or on

the back, when it is called respectively an anterior or a posterior gastro-enterostomy. And by way of making a little variety, someone has invented an inferior gastro-enterostomy, which is something between the two, and great discussions sometimes take place as to which is the best of these three methods. The posterior is said by some to be better because the flow from the stomach should be more direct. And further, that, if the small intestine is attached to the stomach on the posterior surface the transverse colon, which then lies anterior, is left quite free and normal. On the other hand, in attaching intestine to the anterior part of the stomach it is, of course, brought across the front of the transverse colon, and so presses upon that part of the intestine, placing it subsequently at a disadvantage, to such a degree it is sometimes said, as to produce partial obstruction. This has been held by some people to be a strong objection to the anterior operation, but in practice I have never seen any such harm arise from the anterior operation, which is the one I invariably use myself if the condition of the disease permits. It is by far the easiest method of gastro-enterostomy. The posterior operation certainly takes a longer time than the anterior, and moreover is sometimes extremely difficult; I have seen profuse hæmorrhage during its performance, and there are other risks which do not arise in the anterior operation. I have come to my preference for the anterior operation after having tried the posterior and also the inferior on several occasions. The anterior form is easier because everything is so accessible: the stomach lies right under the incision in the abdomen, the small intestine is easily drawn up, and the colon is tucked back beneath it. And I have never seen any of those problematical secondary consequences in connection with the relation of the small intestine to the colon, and speaking generally I do not think they arise. Fortunately, things which theoretically should occur do not always happen in practice. In one important respect the anterior operation is certainly superior to the others, viz. that regurgitation is much less likely to occur after it. A great point is sometimes made about the rapidity with which these operations can be done. Of course different operators take a different time in doing the same operation, and with this idea of rapidity in mind there have been devised from time to time all sorts of mechanical contrivances which are supposed to reduce the

length of time required—for instance bobbins, plates, buttons, and other things—and these are, I believe, still used by some people. But as a rule it will be found that as an operator progresses in experience he gradually leaves off using these mechanical contrivances. That is almost the universal result; the greater a man's experience the less inclined he is to rely upon mechanical contrivances for his operations, which seems to suggest that mechanical contrivances to some extent take the place of manipulative dexterity. They are, however, used occasionally purely with the view of preventing loss of time in the operation. It is well in connection with this point that you should bear in mind that in abdominal operations of this kind—we are dealing at present with gastro-enterostomy—the actual time occupied in connecting the two portions of viscera is very small, only a few minutes. It is not that part of the operation which occupies the most time; on the contrary, the great part of the time is occupied in the opening of the abdomen, the examination of the viscera to be dealt with, the selection of the proper parts for anastomosis, and, after the anastomosis has been accomplished, the readjustment of all the parts which have been disturbed and the bringing together of the abdominal wound. The actual sewing together of the two parts, which is the crux of the operation, does not generally take up much time; hence the saving of time effected by these mechanical contrivances to which I have referred must be very small. The use of a mechanical contrivance does not help the opening of the abdomen, make the handling of the parts easier, or get the parts more quickly ready for connection; and the actual process of connecting the two parts to each other is, and can only be, shortened by a very small amount by any mechanical contrivance. Moreover there are certain disadvantages about all these mechanical contrivances which in my opinion negative any little advantage which you may get in the saving of time. The plan I use myself in all intestinal joinings is direct interrupted suture passing through all the coats of the bowel, the knots lying inside the gut. The join thus made is as strong as it is possible to obtain and is quickly effected; I have never seen harm come of including all the intestinal coats. With regard to the course subsequent to operation in these cases, remember that the greatest danger is collapse within forty-eight hours, and that the very best means of preventing this is to give hot water in good quantities by the mouth, the patient being well propped up, which facilitates the passage of the hot water directly into the small intestine through the recently made opening, this passage of fluid being further facilitated if the patient attempts to vomit in consequence of the absence of any sphincter action about the new opening.

Chesterfield Street,

Mayfair;

January 23rd. 1905.

THE MANAGEMENT OF EARLY, TRANSITORY, AND ILL-DEFINED MENTAL DISORDERS.

By F. GRAHAM CROOKSHANK, M.D.Lond.

MR. CHAIRMAN AND GENTLEMEN,—It may perhaps be affirmed without risk of contradiction, that the practical management of early, transitory, and ill-defined mental disorders is not taught in the schools. The student does not learn in the wards, from his clinical instructors, how to deal with these conditions, and is not caused to realise how much of a practitioner's life is spent in dealing with them, and how greatly professional success may depend on the management of them. The house physician feels the unworthiness of spending, on the analysis of the psychical phenomena of hysteria, time which might be devoted, let us say, to the study of a bacteriological broth. He looks on "functional" cases as very tiresome things indeed, and however keen he may be on the niceties of technique involved in differentiating three or four leucocytes, he does not care, in cases of mental disorder, to refine a degree further than is necessary to the distribution of the alphabetical nicknames "G. P. I.," "D. T.'s," and "Hys."

Should a general practitioner send into the wards a patient whose visceral and mental perversities make her own and her friends' lives miserable, the chances are that she will be given "a doing with the battery" and be sent home with an intimation that "surprise is felt such a case should be considered one for hospital treatment." Indeed, in at least one London hospital students are taught there are only two classes of patients in this world worthy of attention: those with actual organic disease, and those who have "nothing at all the matter" with them.

Under these circumstances, the value of some asylum experience is, to the young practitioner, very great. In an asylum he is brought into intimate relation with those who are mentally perverted, and are acknowledged so to be; and he makes poor use of his opportunities if he do not speedily recognise the distinction between "bodily" and "mental" disease to be merely arbitrary, and those afflicted with so-called "mental disease" to be suffering from an abnormal condition of brain cells, which may be structural, nutritional, or

toxæmic, but is no less "real" and "physical" than is the cellular condition underlying pneumonia or cancer. He ceases to wonder why the public persistently ask advice of those they call "brain specialists" rather than of those they call "mad doctors"; and he reads with sorrow and amazement the cyclopædic productions of twentieth century medicine in which disquisitions on "Mental Diseases" are relegated to a volume other than that dealing with "Disorders of the Brain and Nervous System." But this experience, valuable as it is, is, in itself, incomplete.

To realise "mental disease" the patient must be seen in his natural environment. In an asylum, mental disorders are seen under artificial and arbitrary conditions; divorced from their original matrix. Valuable as what the papers call "incarceration" may be as a therapeutic measure, it is not, I submit, the condition proper to the study of the natural history of "mental disease." The conduct of the insane in an asylum is not the natural conduct of the insane. Who would seek to study, at Regent's Park, the natural habits of the polar bear? I venture to think that one reason why the study of "mental disease" has been as yet so singularly sterile is that it has been conducted under artificial conditions which bear about as much relation to natural conditions as does the life of the gorilla at the Zoo to that of its forest progenitor.

As a matter of fact, it is the general practitioner who has, although he sadly neglects it, the best opportunity of studying insanity, watching as he may do from the beginning the progress of mental dissolution under the pressure of environmental conditions. The general practitioner has it in his power to observe, and sometimes to modify, the initial processes of mental disorders, and an ampler knowledge of how to diagnose and treat early cases would do more to check the rising tide of insanity than can the most elaborate of "colonies" or palatial asylums.

Practitioners who have had no actual experience of lunacy draw their ideas very largely from those text-books of "Mental Disease," read by students in their moments of relaxation, in which spicy and sometimes salacious details are interspersed with Shakesperian quotations and allusions to the apocryphal epilepsies of Julius Cæsar, Mahomet, and Napoleon. It is little wonder, then, that certificates such as this, concerning a Frenchman, have

to be dealt with: "This person is eccentric; his speech is broken; he is a foreigner and will not allow me to examine him."

It is a platitude to say that the first step towards successful treatment is taken when a correct diagnosis is made. And concerning diagnosis, there are one or two points to which I would make allusion. First of these is the importance of Sankey's generalisation that insanity is a process tending naturally to pass in order through the successive stages of melancholia, mania and dementia.

The value of the application of this generalisation, both in diagnosis and in prognosis, cannot be over-estimated. Stated in another way it means that in all insanities there is an initial stage of melancholia. It is in the practitioner's ability to recognise this early, almost prodromal, stage, that his capacity for early diagnosis exists.

Some amplification of the statement that all insanities pass through an initial stage of melancholia is needed; and it is an amplification which involves a knowledge of what melancholia really is. The essence of melancholia is not, paradoxical as it may seem, a depressed tone of feeling; nor even, to put it another way, is melancholy always a cardinal symptom of melancholia. What Sankey meant by "melancholia" was not an unhealthy state of mind characterised by pathological "melancholy," but rather that first in the series of groups of psychical phenomena which, when arranged in the order converse to evolution, constitutes progressive insanity—that group which, composed for each individual of a total sum of states of consciousness made up of an absolutely reduced sum of states of object consciousness, accompanied by a relatively increased sum of states of subject consciousness, is nine times out of ten accompanied by a depressed emotional tone because of the perceived lack of adjustment between the subjective self and the environment. Nine times out of ten there is such a depressed emotional tone, but not always. The individual may be content: though we others recognise his difference from us. Those who have the capacity for adjusting their environment to their new ego, if the process of dissolution be not progressive, remain eccentric. Those who have not the capacity become melancholy.

If we recognise insanity psychically as a series of groups of psychical phenomena arranged in an order

the reverse of that of evolution, we must acknowledge as evidence of the onset of insanity a reduction, in the intensity or the sum, of those states of consciousness which relate to the objective world, and which are, of all psychical states, those least organised, differentiated, and most heterogeneous.

Clinical instances are ready to hand:—The puerperal peasant on waking does not ask for her baby; the statesman “forgets Goschen”; the speculator is oblivious to the indications of political movements; the working man’s wife loses zest in her gossip with her neighbours; the social man overlooks the genial salutation of his friends; and the physician relies on his “clinical instinct” rather than on the methods of physical examination. These trifles indicate a stage, which may be brief and hurriedly passed through, but is a stage of “too much ego in one’s cosmos”: a stage comparable to that in which alcohol, chloroform, or sleep first assert their sway—a stage in which identity is preserved, subjective self is relatively too prominent, and the environment is seen through a glass darkly.

This relative rise of self in a man’s mental life is of paramount importance in diagnosis; but it is a rise of self that depends on a less acute perception of surroundings; it is not selfishness—not the mere gratification of self—but an enhanced idea of importance of self, which, far from being always connoted with exaltation of feeling, is very characteristically accompanied by a feeling of depression caused by the realisation that the subjective self is not adjusted to the real not self; that, in fact, “the times are out of joint.”

It may be noted as a corollary to this that friendship is the rarest trait in insanity, and the forsaking of friends for acquaintances is an indication of importance.

Secondly, it is doubtful whether sufficient attention is paid, in diagnosis, to the observation of the physical signs of insanity.

The physical signs of insanity fall into two groups.

The first of these consists of certain physical conditions correlated with congenital or hereditary instability or imperfection of the central nervous system, and more particularly of its highest levels, *i. e.*, stigmata; points of asymmetry; cranial and facial conformations; aural abnormalities; palatal configurations; and epidermal, or rather epiblastic, eccentricities.

But it is to the second group that one would rather direct attention—the group consisting of physical signs of functional imperfection of those cells of the central nervous system whose activities bear a relation to states of consciousness comparable to that which the electrical conditions of an inducing coil bear to those of the secondary coil.

Without raising the question of causal relation between psychical and physical phenomena, one may pause to affirm that certain states of consciousness are demonstrably accompanied by functional states of brain-cells. And although it may be a logomachy to ask whether all functional states of nerve-cells are accompanied by psychical states, few will negative the proposition that all psychical states are accompanied by functional states of nerve-cells. The theoretical relationship of these psychical and physical states expressed by the parallelistic hypothesis of Jackson is as well illustrated by the analogy of the currents in a primary and secondary coil as by any other. And as the essence of parallelism is the absence of any point of coincidence or approximation, and we have lately learned that matter and force are reciprocally convertible, it may be as well to avoid the use of terms and analogies which affirm the irreconcilability of psychical and physical states.

To return to the point affirmed, that functional states of brain-cells accompany all psychical states, and granted further that these states vary reciprocally, we may consider with some degree of confidence that the abnormality or otherwise of the peripheral expression of these states of brain-cells will afford some indication of the abnormality or otherwise of the correlated or induced psychical states. In the peripheral resultants of functional conditions of central nerve-cells, particularly of those of the highest levels, we have the physical signs proper of insanity. These peripheral effects cannot be hypothetical only, for we must deny the existence of brain-cells which have no place in any reflex arc and have no outgoing nervous currents whatever.

These peripheral effects must be, to a great extent, contractions of voluntary or involuntary muscles. They may be secretory or trophic. Jackson has enunciated the remarkable law (which, though it expresses truth, may not express the whole truth) that in every case of insanity a negative lesion of highest centres exists which causes

some paralysis, sensory or motor. It is these paralysees which, when motor, are the most easily observed physical signs of insanity. Sensory paralysees are important, but have a theoretical relation to the central condition differing from that of motor paralysees, which are negative outgoing effects. Jackson's illustrations have been hitherto confined almost entirely, I believe, to the insanities of epilepsy and the post-epileptic state; and though Dr Anderson has brilliantly discussed general paralysis, and Dr Mercier coma, in the light of this hypothesis, there has been, so far as I know, no serious attempt to analyse ordinary insanities from this point of view.

When case-taking we should endeavour to note the physical signs of the patient, the asymmetry or lack of expression, the unsuitability of the expression, the mode of speech, of gait, of co-ordinated and complex actions, of respiration, of vasomotor conditions, of habits, restlessness, passivity, and what not, with the same zeal and accuracy as we see exhibited in the clinical wards of a general hospital. An attempt should be always made to express these signs, not only in terms of the peripheral effect, but in terms of the centres affected; just as, when dealing with Jacksonian epilepsy, we do not call the disease an affection of muscles, but of a certain brain area. In this way real progress may perhaps be made in the clinical study of insanity.*

The discovery of physical indicia allows one with justice to attach weight, as evidence of insanity, to ethical, or rather unethical, proceedings which, considered abstractedly, are indicative of bad manners or morals rather than of incipient disease; for lapses which at first seem merely errors of taste have to be regarded otherwise when a pupil is found to waver or a knee-jerk to be excessive.

The practitioner when confronted with incipient mental disorder should at once ask himself what is the probable physical cause of the process of which he is witnessing the early stage. On his answer to this question depends his treatment of this case. If the disease be one which from its cause affords reasonable hope of a rapid recovery, home treatment may be entered on confidently; but if the ætiological indications point to a prolonged illness and tardy recovery, in the majority of cases prompt and early institutional management has to

be advised. It is unnecessary to point out why the prognosis depends, not on the quality of the mental and physical indicia, but on the physical cause of the central condition. This fact alone, however, justifies the attempt to express physical signs in terms of the brain levels and centres involved. For this attempt must be made before we can logically push our inquiries as to the probable cause of the morbid condition of the nerve centres, whether it be stress, toxæmia, organic changes, or nutritional defects.

The necessity in many cases for prompt and early institutional treatment has been alluded to. As a general practitioner I firmly believe that, whenever it is recognised that institutional treatment will be sooner or later necessary, it should be entered on at once, in the interest of society and the patient alike. Who, in dealing with a case of early phthisis needing prompt measures and protracted treatment, would say to the patient's relatives, "There is little, if any, chance of cure unless sanatorium treatment be adopted. I therefore advise you to defer sanatorium treatment until all other measures have failed"? Is this an unfair transliteration of the advice given every day to the relatives of the insane? Over and over again one hears said: "This case undoubtedly will in the long run come to an asylum, and *that* is the only chance of cure. Let us, however, advise first a change, and then single care"!

This line of action, it seems to me, is not only wrong, but cowardly. Why in dealing with lunacy should it ever be thought wise to palter with facts? If the public talk of "stigma" in connection with asylums, we should think whether it is not the advice of many physicians that has fostered this talk of "stigma."

If we put away our clinical prudery in dealing with early cases of insanity, the public will assume a more reasonable attitude. We should urge certification and institutional treatment at once and fearlessly whenever the interests of the patient demand it. As long as medical men are willing in the coroner's court to soften hard facts and, instead of plainly ascribing suicide to chronic insanity, talk glibly of temporary depression and so forth, so long will persons keep their insane relatives at home, at the risk, or even in the tacit hope, of suicide, instead of letting them be cured at the expense of the "stigma" we and they talk about

* "The Physical Signs of Insanity," 'Journal of Mental Science,' 1900.

so weakly and selfishly—a “stigma” which means, whatever we pretend, a “stigma” on the relatives rather than on the patient.

The duty of the practitioner in dealing with early and ill-defined cases of insanity is, then, to make as early and positive a diagnosis as possible, expressing to himself the diagnosis first in terms of the brain-levels evolved, and secondly in terms of the physical processes affecting these brain-levels or portions of brain-levels. By this diagnosis, and the consequent prognosis, treatment may from the first be determined, not with a view to lessening social difficulties, but with a single eye to the sole aim of benefiting the patient.

There are many cases in which a scientific diagnosis enables one to forecast a happy issue without recourse to institutional treatment. They are chiefly those which prove transitory if boldly handled; and some of those ill-defined cases of the sort called “nervous,” “brain cases,” and what-not, which, unless properly managed, may drift slowly for years to a melancholy end.

It is in dealing with these cases that the general practitioner has his opportunities; for, as I have said, he, better than any other, has the opportunity of studying them in the “matrix” which determines them, and of watching, as months and years go by, undercurrents leading to suicide and madness which may yet be concealed, because of the apparent smoothness of the life of those who, as Kipling says, “lag by suburban ways.”

The family doctor can perhaps appraise better than the specialist the share which the routine of middle- and working-class life, the bitterness of social trivialities and of daily worries, the absence of contact with anything either beautiful or noble, have in formulating insanity. It is not his task to spend time on the differentiation between the text-book “kinds” of insanity. It is far more important that he should discard the idea that what the books call “kinds of insanity,” melancholia, mania, dementia, and the conditions grouped about them, are aught but stages of one process—the dissolution, in an order the reverse of that of individual and racial evolution, of the functional activities of the brain-cells.

It is as false to speak of melancholia and mania as different mental diseases as it would be to speak of consolidation and cavitation as different lung diseases.

There is a parallelism between the natural history of phthisis and that of insanity which, though purely illustrative, is instructive, and of more than picturesque interest. In both cases we can trace analogous variations in onset and in progress—sudden fulminations and recoveries, insidious origins and chronic courses, acute relapses, partial and generalised affections, and in both a tendency to orderly progression through definite stages. In both processes one can sometimes trace hereditary predisposition and family types: sometimes we find the condition of the individual the factor of predominant importance; at other times the environment is at fault and is determinative; both disorders may be correlated with physical characteristics which play no part in the process of disease.

In insanity, as in phthisis, diagnosis at the earliest moment is of paramount importance, and must carry with it a definite forecast of the probable issue under alternative conditions. Sometimes, in insanity as in phthisis, the physician will succeed in spite of family and personal characteristics of apparently overwhelming force; and at other times he fails when conditions seem most favourable. In both diseases he must, if he wish to be successful, enter into the minutest details of the patient's life, and grasp the trivialities of his environment with discernment and discretion, attacking resolutely, step by step, the slightest deviations from normal conditions.

Many cases of insanity may be brought to a happy issue if early recognised and boldly treated in the stage which may be compared to the pre-tuberculous stage of phthisis. Such an early stage is often marked by what is called nerve breakdown or neurasthenia; by pseudo-hysterical melancholia which may be confounded with pessimism; by delusions which pass muster as wrong-headedness or perversity; by lack of restraint which is appreciated as joviality; by eroticism which is palliated as sentiment; by irritability and passion which is ascribed to worry; and by irrational self-sacrifice which is dignified as pious philanthropy. When the attention of the physician is called to these manifestations by relatives and friends who hope to induce him to lend his authority to their euphemisms, his first duty is to explain the actual condition without cloudy verbiage, stating the probable result if these matters are left to “right

themselves." In many cases, and especially when these manifestations are acute, recent, and tending to increase, he will do well to declare his intention of securing to the patient absolute rest, and in the beginning rest in bed. If he is observant, he will not fail to find physical symptoms which he may urge alone justify this course.

The importance in practice of dealing faithfully with patients' relatives cannot be over estimated. At the outset they usually express doubts as to one's reception by the patient, and anxiously ask that they may prepare him or her for one's visit, begging to be allowed to say one has dropped in by accident, or to see some other member of the family. Indeed, the popular idea would seem to be that lunatics are best managed by falsehood.

It should not be necessary to say that, with firmness and courtesy, one should at once decline to lend oneself to suggestions of "diplomacy" or to countenance the idea that tact is inseparable from mendacity. To go straight to the patient, to tell him or her that one has come at the relatives' request, and to proceed as in an ordinary visit, is the right course. In this way confidence is best obtained, and the patient soonest realises that he or she is really ill and is to be got better. Let the patient be told, after a careful examination, which should always include the chest and abdomen, that a definite illness exists, to be remedied by definite means. Some hazy idea of this is at the bottom of the popular demand for a brain specialist in place of the old-fashioned "mad doctor." The idea of a "brain specialist" connotes the idea of real illness, and is a revolt against the conception of "mental disease," a term which might well be relegated to the mental dustheap. At the same time, the public do, perhaps, allow these ideas of brain specialists too loose a rein. I was privileged to see the other day a list of names armed with which a lady set out recently to obtain advice for a relative. The family, who had what is described as a pretty taste in consultants, compiled, from their own resources, a list of "specialists" which comprised one gynecologist, the junior physician of a chest hospital, two surgeons, and three general physicians, all reputed authorities on "nerves," and, therefore, as was pointedly remarked, better able to give an unbiassed opinion than one who had made a special study of "insanity." Ludicrous as this may seem, it is impossible to be angry

with those of the laity who feel that mental disorder has a physical basis and ought to be combated by medical means.

A further ludicrous instance of distrust in the methods of specialism occurred to me when recently about to certify a lady of intelligence and education. In filling up the statement of particulars, the brother, a man of the world, hesitated to state the undoubted fact that the lady was of dangerous tendencies. He said, very courteously, that he would prefer to avoid reference to the question of violence lest it should lead the magistrate to take an unduly severe view of his sister's case, as he felt sure that in asylums medical remedies were not used, and that treatment was merely a discrimination in discipline based on the facts set out in the certificate. It is a widespread belief, even amongst those who have the greatest confidence in the humanity of asylums, that "specialist" treatment therein does not involve the use of ordinary clinical methods. Is there no tittle of justification for this belief? Certainly the prescription and definition of physical means of treatment wins very speedily the confidence of the laity.

To exclude relatives from the sick-room as a first step is almost always necessary. It should not be difficult. But it is usual, at any rate in the less wealthy ranks of life, for the doctor to be told that the patient will resist the ministrations of a stranger; and, when one insists on the advisability of a nurse or nurses being procured, the services of a relative, "not exactly a nurse, but one with experience of sick-rooms, and who has been ill with nerves herself," are proffered. This skilled relative is always supposed to be endued with tact. She is usually neurotic, untrustworthy, and disloyal to both patient and doctor; and it becomes necessary to tell the patient's guardians that it is a singular phenomenon of the disease that food will be better taken from, and directions better enforced by, a stranger, and that one advantage of employing a trained nurse is the fact that he or she, at the termination of the case, can be sent away, so that no recollection of such ministrations need be revived.

The best nurse is not so often one with asylum training as one who has learnt in private practice how frequently complete and happy recoveries occur. A fault of nurses trained in asylums is

pessimism: excellent in hopeless cases, they despair too soon, and display the specialists' tendency to resent improvement which takes place under conditions other than those they consider proper. Absolute veracity towards the patient is, needless to say, as necessary as in dealing with the relatives. Nothing gives a patient greater confidence in a doctor's healing powers than a belief in his veracity, and nothing destroys confidence so much as a discovered gloss upon facts, however praiseworthy its object. And a nurse who, with may be the most worthy motive, departs, in conversation with the patient on his or her condition, in any way from the strict truth, is unfitted for her vocation. It is not difficult to "humour" patients if need be by employing forms of words absolutely veracious.

With regard to the feeding of cases which are acute, I suppose there is little disagreement. Abundance of fresh—that is, unsterilised—milk, rich in fat, is the staple food, and has to be given freely and regularly and at frequent intervals.

The belief that milk so given has an almost specific effect derives more than a little theoretical support from the extraordinary results recently obtained in Munk's laboratory. I make no apology for quoting these experiments, for it is well understood that no purely clinical observation is worthy of attention if it be not supported by observation made under the totally divergent conditions of the laboratory. Munk has found—and it is certainly very remarkable—that if a thyroidectomised dog be fed on meat, its symptoms persist, but if fed on milk, all the evidences of acute toxæmia disappear. It is not too remote a speculation to hazard that fresh milk contains a substance antagonistic to those normally combated by thyroid activity, and it is of course obvious that it is chiefly in the acute insanities that we have the best chance of correcting metabolic and nutritional perversions.

I am not positively aware that Munk's results were obtained with fresh milk only, but it would seem probable that they were. I am certain of this, that milk feeding, unless it is with unsterilised milk, fails to give the best results in acute cases of mental disorder.

However this may be, it is certain that in particular blood-states a profound difference exists between milk and meat as food-stuffs.

Although it ought not to be so, as a rule milk

diet is not prescribed with sufficient definition. Vague instructions to the effect that so much milk is to be consumed in twenty-four hours are of little value. The quantities to be consumed at definite intervals must be precisely indicated, and the form in which the milk is to be taken must be plainly stated. If milk tea, milk and egg, soda and milk, Koumiss, milk cocoa, junket, plain hot milk, Benger's food, and milk with the addition of Horlick's malted food be given in turn, there is variety enough to please any patient and arrest the attention of any nurse. Peptonised milk, milk with isinglass, or arrowroot, and twenty other variants can be employed, but there are few forms so valuable as milk to which Horlick's food has been added. This food preparation at once breaks up the heavy curd, aids absorption, and promotes peristalsis. Personally I always, in acute cases, continue the milk diet as an exclusive regimen till all mental symptoms have disappeared, and then at first introduce chicken and fish pounded with cream, and tripe and other gelatinous foods seethed in milk. Beef-tea I am sure is frequently positively harmful.

When giving milk in large quantities it is a good plan to administer salol, not in tabloid form, but as five-grain powders dissolved in milk four or six times a day. The salol not only cleans the tongue and prevents fœtor of the breath at the same time that it disinfects the sluggish bowels, but it relieves the flatulence which so often accompanies a milk diet. It also prevents the "milky tongue." It can thus be usefully employed in cases other than those in which we may suspect the ætiological importance of toxic absorption from the alimentary canal, when we endeavour during the weeks of convalescence to procure a gain in body weight while feeding the patient on foods into which milk largely enters.

I suppose we all expect to hear, when seeing a patient in the early stages of insanity, that he or she has been taking "bromide" without effect. It is difficult to ascertain what justification other than tradition there is for giving bromides in acute mental disorders. It has no effect on the patient in the stage of melancholy except to make him still more miserable; it certainly does not quiet the patient who has progressed to the stage of mania.

We know that in the stage of melancholia the

activities of the highest level cells are diminished, and we know that the effect of bromide is to diminish them still more.

We know that when our patient is maniacal there is unfettered reflex activity of the brain levels below the highest, and we know that to procure recovery we have to induce and re-establish the inhibitory action of these highest levels. It is hardly to be wondered at, then, that we are so constantly told—perfectly correctly—that our sleeping draughts “excite the patient.” Of course they do; they effectively abolish what little control the highest levels still afford.

But when it is absolutely necessary that there should be cessation of muscular activity during the time that we seek to allow the brain-cells highest in the nervous hierarchy, an opportunity to right themselves and free their clogging wheels, we may employ a drug which is almost invariably safe. I mean paraldehyde, which, when given in large enough doses in hot whisky or brandy and water at the very onset of an attack, will procure sleep for six to twelve hours with the very happiest results. Of course the use of paraldehyde is commonplace in asylums, but I do not think that the advantages which may follow from its administration at the very earliest suspicion of mental perversion are very well known to practitioners. I am sure, for instance, that not a few cases of puerperal insanity would be averted if, instead of pottering with a little bromide, *3ii* or even *3iii* of paraldehyde were given at once when wakefulness, restlessness, and that most valuable of signs, lack of maternal interest, become apparent.

To recapitulate, I believe that it is the best course for the practitioner at the very onset, almost at the verge of suspicion of acute mental disorder, to put his patient to bed, give a smart purge, enforce absolute rest, secure six to twelve hours' sleep by an efficient dose of paraldehyde, at once, order carefully a diet of fresh unsterilised milk, and continue with it the administration of intestinal antiseptics.

I believe that attacks of definite insanity lasting a few days only are more frequent than they formerly were. They are very important, affecting as they do not only the physical but the social future of the patient. The earlier they are cut short the less likely is there to be permanent mental weakening. Perhaps a very large amount

of crime, vice, and anti-social activity generally is the effect of slight, even very slight, lack of control, left, as a brain scar, from brief attacks of mental disorder at puberty, during adolescence, and in early adult life. Nothing is more important than to secure early and complete recovery, else a condition is left which passes easily, under provocation or stress, into the conditions classed as “ill-defined” and “borderland.”

In the management of the many ill-defined and borderland cases seen in daily practice it is necessary, in order to determine whether the cases are sequential to past acute attacks or are primary, to enter with the greatest care and attention into the minutiae of the patient's daily life, to grasp his environment, both present and past. I was much struck when reading recently a book of reminiscences to note the trait in the professional character of the late Sir A. Clark which most impressed a man of considerable academic and literary distinction. It was the attention he paid to the observation in daily life of the minutiae of personal hygiene. As the author I refer to says, Sir A. Clark did not fail to appreciate the profound effect produced on the system by the operation over long periods of time of attention to small things, an effect which is often forgotten by medical men when the cure of disease is eagerly sought from the more violent bodily perturbations produced by the sudden and temporary administration of drugs.

Similarly, in seeking the causes of disease we are too apt to fix our attention on the apparently proximal cause, and to forget the potency for evil as well as for good of things apparently incon- siderable acting during long periods of time.

In one case it is found on careful inquiry that the breakdown at fifty is the result of a process that started with boyish troubles at puberty, and has been aggravated by forty years of morbid self-denial and secret vice. How completely the prognosis and treatment in such a case, when the full history is elicited, must differ from the prognosis and treatment sequential to a conventional diagnosis of overwork! In another case on inquiry one finds that what is really needed is the application of the trans-Atlantic joke— a holiday trip, not for the patient, but for his wife. Not a few men in the prime of life, on the verge of melancholia, to whom the usual perfunctory advice has been given, recover completely when domestic arrange-

ments are overhauled, and suitable meals arranged to speed the breadwinner in the morning and recuperate him in the evening. Climacteric insanity might have been averted from many a woman's life if she had not been for years chained to the deadly wheel of suburban routine, perhaps the most joyless and petty form of existence that there is. Sometimes the delusions of middle life have had their origin in half-forgotten conjugal troubles of twenty years before; and the professional man's breakdown at sixty may be really due, not to the over-work of later years, but to the disappointments of early life.

Though the clock cannot be set back by any man, careful observation and examination will yet enable him to give sympathetically the right advice, and will spare him the futility of uttering the fatuous commonplaces that medical convention as a rule dictates. As a miserable, badly nourished youth who had attempted suicide once said to me, it was all very well for the jolly, well-fed specialist to drive luxuriously to see him, and, at the acme of worldly prosperity, to talk of the wrong of self-destruction and the ethical questions involved; but it did not help him with his troubles. On the other hand, the physician who tried to enter into the patient's state of mind, grasped the physical and social questions at issue, and successfully re-adjusted them, did real service to one who had merely thought to take up arms against a sea of troubles and, by opposing, end them.

It is the failure to construct an accurate picture of the present and past environment that causes lack of success in treating cases of borderland insanity and hysteria. Without constructing such a picture it is impossible to affect favourably the patient's self-consciousness, and one is prevented from addressing the patient with the confident boldness that alone is successful. And, personally, I have found that the most successful plan in dealing with chronic cases of borderland disorder, and with the chronic hysteria of adult women, is to go straight to the point and say exactly what is the matter without periphrasis or inaccurate assertion.

Matters should be explained simply and definitely to a husband or other responsible person, and permission should be obtained for the patient to be explicitly dealt with.

To judge by the surprise and gratification of

patients and their relatives, the method of plain dealing is less common than it should be. To be successful it is necessary that the physician himself should be confident of his grasp of the physical condition of the patient, and of the influences that have determined his or her condition.

One feels the greatest surprise and disgust at the recital by neurotic and half-insane women of their woes, especially when eked out by a show of prescriptions—digitalis ordered by Sir A. B. for the heart; pepsine, by Sir C. D., for the stomach; bromide, by Dr. E. F., for the head; and the pessary, by Dr. X. Y. Z., for the uterus—knowing that not one of the conditions to which these prescriptions and implements are ostensibly directed are other than reflexes brought about by perversion of the brain centres in which the respective viscera are represented.

We all know Ribot's classical experiment: extend the arm; look at the finger-tip and concentrate attention on it. In some few seconds sensations of pain and discomfort are felt, due to pressure on local nerves from local vaso-dilatation. Who would order cooling lotions for such sensations? Yet are the prescriptions of digitalis and pepsine for analogous conditions of heart and belly a whit more rational? These conditions are central, and must be treated centrally, and by the truth and plain speaking. I have never once regretted for the patients' sake having told them the exact facts, and the exact value of Sir Tumley Snuffins' elegant prescriptions, and one's only sorrow is that so many lives should have been wrecked by vain confidence in diagnoses of "nerves," weak heart, and so forth.

Failure in grasping the facts of a patient's environment leads not only to errors in drugging, but to another piece of advice which is often peculiarly fatuous—the prescription of what is called a thorough change.

Thorough change and rest appears often to mean, not the change of habits, vicious in themselves or by reason of their consequences, not an adjustment of the environment to the needs of the individual, not a placing of the square peg in the square hole, but a sudden and temporary deprivation of intellectual and material comfort, to be followed by a forcible attempt to drive the square peg firmly back into a round hole. It seems to be the opinion of many practitioners that this process

is beneficial. I believe the reverse. In many instances in which cessation from work is ordered it is cessation from play that is needed.

How often does "work" lead to overstrain or breakdown?

Is it not far more often the conditions under which the work is done and the hours of leisure spent that cause the "overstrain" which leads to incompetence for work? Personally it is my habit when dealing with cases of men suffering from "brain-fag," "neurasthenia," or even incipient insanity, to first adjust the method of spending the hours not devoted to work, and only when that fails to deprive the patient of his opportunity for work. To advise a business or professional man to give up work even for a short time is a serious thing, and never to be ordered unless it be found impossible to break through a vicious environmental circle without absence from home. In those cases, far more numerous than English physicians recognise, in which physiologically irregular sexual relations are the cause of trouble leading to the threshold of insanity, and are so commonly diagnosed as "overwork," the prescription of rest and change in the sense I have described is mischievous to a degree.

In the management of ill-defined and borderland cases of insanity, although it is necessary carefully to determine the mental attitude which has to be adopted towards the patient, and to consider how best the environment can be adapted towards his or her special necessities, yet a very great deal can be effected by physical means.

The most careful "present state" must be taken, not only as regards the specific illness, but of the general constitution. There is no detail that does not deserve and reward attention. Although it is a commonplace to say that the condition of the skin, bowels, and urine should be examined, and if faulty, rectified, this is not always carried out with sufficient thoroughness. Apart altogether from the direct benefit obtained by the prescription of a regime intended to rectify disorders of function by persistent operation, there is the very great advantage that the laying down of definite rules impresses the patient with the idea that he or she is being treated with resolution and knowledge for a bodily illness which is curable and about to be cured. This is sometimes half the battle. Attention to oral hygiene is of vast importance. It is not an

exaggeration to say that cases of alcoholic insanity have been cured by the dentist. For very often the liquor habit has had its origin in faulty digestion depending on lack of masticatory apparatus, spirits being taken first to promote digestion, and secondly to supply the place of food. And so definite recurrent alcoholic mania has been cured in a sense by a well-fitting denture having broken a vicious circle. The absorption of toxic matter from decaying stumps is sometimes as real a cause of insanity as is absorption from the bowels.

And never should the condition of the eyes be overlooked.

No case of neurosis, neurasthenia, or borderland insanity should ever be treated without the most careful reference to the condition of eyes, ear, nose, mouth, heart, lungs, stomach, bowels, and pelvic organs, differentiating between those conditions which are primary and those which are reflex. Primary disease of these parts may variously (1) set up toxæmia; (2) send to nerve centres in which they have representation impressions which may become the origin of delusions; (3) be the basis of hallucinations; (4) contribute towards the abnormal cellular states, nutritional or degenerative, which lead to progressive and general brain failure; (5) determine in special ways the course of primary brain failure. These facts are well enough recognised. Yet we all know how fully local treatment based on knowledge of these facts has been tried in asylums and yet with what disappointing results.

But the time for local physical treatment is the early stage, the stage which for insanity corresponds to the pre-tuberculous stage of phthisis, and it is upon the diagnostic acumen of the practitioner that his opportunities for the successful treatment in this way of incipient mental disorder depends.

That insanity is not treated more energetically in the early stages is, perhaps, firstly, because alienists are not better physicians, and physicians better alienists; and secondly, because the general practitioner, on whom the task of early diagnosis and treatment falls, does not recognise the necessity of combining the information that, as a student, he learnt from the alienist with the methods he learnt from the physician. We should state plain facts plainly, and cultivate, when dealing with "mental disease," the attitude of the surgeon rather than that of the diplomatist.

The solution of the problems, now so urgent, raised by the aggregation of so many thousands of hopeless lunatics in asylums, lies, surely, in earlier and more hopefully energetic treatment on lines of candour and common-sense, following the recognition of the fact that "mental disease" is physical disease, to be treated as such at the beginning.

We need greatly a study of insanity that is clinical and not literary, and this we shall not gain while so many of those who have the care of the insane are forced to devote time and energy to what is really hotel-keeping and farming.

One reason, perhaps, for our lack of healthy optimism in initiating treatment is the far too gloomy view we take of the value to the community of those who have once suffered from "mental disease," a view which seems to make many think they would be committing an act antagonistic to society in assisting to restore to society those who have once so suffered.

It may be questioned if the paucity of genius or even commanding eminence of talent at the present time be not in part at least connected with the ruthless way in which those who are not commonplace are now branded as "eccentric" and pointed at as "queer." May not the eagerness of commonplace persons to hunt out in their contemporaries the, to them, disqualifying abnormalities which are regarded as evidence of social unfitness, be tending to produce a dead-level of sterile mediocrity? It is very well to dwell on the potentialities for evil of those who are not cast in conventional mould. But that which is most highly organised is that which is least stable. Should we not learn from Art to compare the beauty of the irregular productions of the old handicraftsmen with the elaborate and machine-made uniformities that now take their place? And should we not remember with humility

"when spake

One vessel of a more ungainly make:

'They sneer at me for leaning all awry;'

What! Did the hand, then, of the potter shake?"

Barnes;

January 23rd, 1905.

'Tabloid' Ophthalmic Zinc Sulphate, gr. $\frac{1}{80}$, and Cocaine Hydrochloride, gr. $\frac{1}{80}$.—This combination of zinc sulphate with cocaine hydrochloride is now issued by Burroughs, Wellcome and Co. It will be found useful when it is desired to prescribe a painless astringent in ophthalmic practice.

SOME HEALTH RESORTS IN FRANCE.

Lamotte-Beuvron; Nérès.—In the autumn of 1904 a party of over one hundred medical men visited the health resorts and watering places in the centre of France, in the district known as the Auvergne. The visit lasted from September 3rd to 15th, and at every watering station a lecture on the principal points of therapeutic value of the place was delivered by Professor Landouzy. The initiation of these excursions is due to Dr. Carron de la Carrière, of Paris, who has striven with marked success, by means of annual tours, to make known to medical men the merits of the French watering places; he has earned the gratitude of his medical brethren in every country in Europe, and the visit to the Auvergne in 1904 is the sixth tour that he has arranged to the satisfaction of all concerned. The party assembled, on September 3rd, at Lamotte-Beuvron, on the Paris-Toulouse line, and was conducted by Dr. Hervé to his sanatorium in the pine woods near by, where the arrangements for the fresh air treatment of pulmonary complaints, especially of tuberculous affections, evoked much interest. After the establishment had been inspected, the visitors were entertained to lunch. The members of the party then returned to the railway station, where they found a special train waiting to take them on to Nérès.

Nérès is a clean, fresh-looking watering place, prettily placed on a hill looking towards the west. This little town is within a drive of the Chamblet-Nérès Station, about six hours' railway journey from Paris, and is well served in regard to hotel accommodation. Nérès is a favourite bathing-place with French doctors for the treatment of diseases of the nervous system, and patients suffering from rheumatic affections find relief here; it is also recommended for diseases of women. The season lasts from May to October. The chief characteristics of the water from the principal spring are its high temperature (110° to 125° F.), and its richness in nitrogen and organic matter, the latter imparting a peculiar unctuous feeling to the water. Outside the bathing establishment the water can be seen welling up into a large basin giving off bubbles of gas. The organic matter causes a precipitate of a gelatinous nature to form, from which grow *conservæ*, sometimes used for the treatment of skin diseases, especially affections of the nails. Everything required in the way of douches, inhalations, etc., is supplied on a lavish scale, and ample provision is made for amusement. What, however, induces most people to re-visit Nérès is the placid restfulness of the place that has the peculiar charm of just avoiding dullness.

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THE DIAGNOSIS AND TREATMENT OF PERFORATING GASTRIC AND DUODENAL ULCERS.

By W. BRUCE CLARKE, F.R.C.S.,
Surgeon to St. Bartholomew's Hospital.

FEW, if any, cases of illness are so sudden in their onset and so disastrous in their results if left to themselves as those in which a gastric or duodenal ulcer ruptures and permits the escape of intestinal contents into the general peritoneal cavity.

It is customary to divide these cases into acute and chronic, and the two cases which form the subject of my lecture to-day are good instances of the two varieties. I will briefly relate to you their history and results, and you will then, I think, obtain a fair picture of the kind of course which each variety is likely to run.

I will refer to the acute variety first, as we have an example of this form at present in the wards. The individual in question is a male, æt. 34, who gets his living by hawking in the streets. He can give no history of previous indigestion or of any symptom pointing to the fact that there was anything wrong with his digestive tract. Before coming under my care, however, he had been a patient at another hospital for about three months in consequence of pain in his right side, cough and expectoration. He was at that time told he was suffering from an attack of pleurisy. Under treatment he got much better, but does not appear to have completely regained his usual health. His cough vanished now and again for a few days, but appears to have been liable to return on the slightest provocation.

About a fortnight ago he went out as usual to his work after breakfast, and was seized about 10 a.m. with a sudden and violent pain at the pit of the stomach. It was so severe that he staggered and fell. He appears to have rolled on the ground in agony, and is stated to have looked very pale and to have

perspired freely. He was picked up, put upon a stretcher, and brought to the hospital; when he reached the surgery the violence of his pain had somewhat abated and he was able to walk in with assistance. He was seen by Mr. Etherington Smith and sent into Sitwell Ward. As soon as he was undressed and put to bed his condition was as follows:—He was a good deal collapsed, pale and feeble, and too ill to give any satisfactory account of his condition. Pulse 60, feeble and regular; temperature 97.4° . The upper part of his abdomen was tender to touch and scarcely moved at all with respiration. Liver dulness natural. Some harsh breathing at right base. Needless to say, he was kept perfectly quiet in bed and no food administered.

An hour or two later he seemed freer from pain, though still feeble, but the upper part of the abdomen was more swollen and the liver dulness had all but entirely disappeared.

When I saw him for the first time, between eight and nine hours after his first seizure, he was much in the condition that I have just described, with the exception of the fact that there was no area whatever of liver dulness. His whole trunk was perfectly resonant from the clavicle to Poupart's ligament. I have never seen this condition so well marked so far as I can remember in any similar case. The diagnosis of ruptured gastric or duodenal ulcer was, it seemed to me, placed beyond doubt (1) by the sudden onset of the condition and the acute pain in the region of the stomach by which it was accompanied; (2) by the collapse which followed; (3) by the gradual disappearance of liver dulness, which so rapidly supervened after he had been put to bed.

He was taken to the operating theatre and his abdomen opened near the middle line above the umbilicus. As soon as I incised the peritoneum a considerable quantity of gas escaped, followed by semi-digested food. By following the direction from which the food was issuing I found an ulcer just below the left end of the lesser curvature of the stomach. It was clean cut, large enough to admit an ordinary lead pencil, and surrounded by thickened edges. There were some peritoneal adhesions in the neighbourhood, but they were not very firm. I emptied the stomach as far as possible through the ulcer, taking care not to foul the peritoneum any further, and then closed the ulcer

partly by stitches and partly by means of an omental flap.

From half a pint to a pint of stomach contents had found their way into the right flank. A counter opening was made in this region and as much as possible of the food flushed out back through the wound in the middle of the abdomen. A glass drain was inserted in the right loin.

It is just over a fortnight since the operation, and recovery has been uninterrupted and uneventful. To-day the patient is practically well and able to take semi-solid food without difficulty.

There are several points in this case to which I shall again allude later. For the present I want to draw your attention to its more salient features only.

The second case I have to refer to is one that was under my care some few months back. I will read you a short *résumé* of the notes, from which you will see that there is no doubt it belongs to that variety of the disease which is described as chronic.

The man to whom I refer was attacked much in the same way as the case which I have just related. He had not been feeling well for a day or two previously. Shortly after going to his work he was seized with what he described as a severe attack of gripes. He was put into a cab, brought to the hospital, and was placed amongst the medical casualty patients. The casualty physician, when he saw him, at once realized it was no ordinary case of temporary intestinal disturbance; he was sent into the surgery ward, and put to bed. Beyond the fact that he was considered a suitable patient for this ward, *i.e.* that the nature of his ailment was doubtful, there appears to be now no record of what his exact condition was at that time. When I saw him some five hours after the onset of his illness he was lying in bed comparatively free from pain. His pulse was feeble, 64, and his temperature just 98° . I examined his abdomen and found it distinctly tender at the upper part, and not moving as freely as it should. He was better than he had been an hour or two previously, so it was decided to leave him alone. I gave orders that no food should be administered by mouth, and that unless very marked improvement took place he should be moved into the general wards later on in the day.

The day following he had improved still further,

said he felt quite well, and asked for something to eat. The abdomen moved much more freely than it had done the day before. Some liquid food was administered, and on the following day he seemed better still.

He remained stationary for a couple more days, but on the fourth day he was seized with another attack of pain. His pulse fell suddenly to 52. I again examined him. There was nothing abnormal to be detected except a recurrence of the slight lack of movement in the upper part of the abdomen which has already been referred to.

After consultation with two of my surgical colleagues it was decided not to open the abdomen at once, but to let expectant treatment have a further chance.

For five days more he remained much in the same condition, but getting, of course, weaker, as he was being fed almost exclusively by means of nutrient enemata. The diagnosis still remained uncertain. No rise of temperature beyond 99.2° had taken place, and this had only been reached on one occasion. His pulse was feeble, and the movement of the lower ribs and upper part of the abdomen deficient. It seemed useless to wait any longer, and his abdomen was accordingly opened and explored near the middle line above the umbilicus. The incision had to be carried down nearly to the umbilicus, as dense adhesions were encountered in the upper part, some of them evidently of long standing, and it was exceedingly difficult to identify the various structures, altered as they were by inflammatory changes. Some small pockets containing pus were encountered, opened and drained; one of them, much larger than the rest, lay between the stomach and the under surface of the liver. Nothing in the shape of a perforation could be detected. This abscess appeared to be the main seat of the trouble. It was also drained, due care being taken to prevent a general infection of the peritoneum.

For a day or two considerable improvement took place, but a few days later he became suddenly worse and rapidly sank.

The results of the post-mortem examination were extremely interesting. The stomach and liver were firmly bound down by adhesions to the diaphragm and to the surrounding parts. There were several more small abscesses similar to those which had been evacuated at the operation, and one of them

had apparently leaked into the peritoneum, and been the cause of death. The stomach when opened showed signs of old and recent ulceration towards its pyloric end, but no distinct hole could be detected. There was little doubt, however, that a leak had taken place at this spot probably at the commencement of his attack, but from the density of the adhesions it was quite clear that the trouble was one of long standing.

Many points are suggested by these cases. We will consider them *seriatim*.

(1) *What is the causation of these ulcers?* Various theories have been put forward to account for them, but none of these theories afford an adequate explanation of the condition. Ulceration of the stomach most commonly occurs in young and anæmic women, and now that operations are undertaken for the relief of this condition, attention has been drawn to the fact that the disease is not so uncommon in men as it was previously supposed. In men, however, it occurs later in life than in women, and is usually a disease of early middle life. Two main causes have been assigned for the formation of ulcers, viz. thrombosis of the vessels of the stomach and the production of an excess of hydrochloric acid during the process of digestion. There is no doubt that thrombosis is associated with the presence of an ulcer, but no definite facts have so far as I know ever been adduced to show that it precedes the process of ulceration, and can therefore be looked upon as its cause. It is equally certain that though an excess of hydrochloric acid can be found associated with nearly all ulcers, yet there are some few instances in which excess of acid does not occur. One thing is absolutely certain, that whenever these cases have been under skilled observation before perforation has occurred, they are always found to be associated with indigestion, and usually with the presence of bad teeth. Their association with oral sepsis is undoubted, and the *men* in whom they occur are generally addicted to drink. The fact that no previous history of indigestion could be obtained in either of the cases which I have related may perhaps be regarded as singular, but both of the men whose cases I have referred to were unobservant and careless about themselves, and there was no doubt that they drank to excess. It is more than likely that no one cause is responsible for these ulcers. It should rather be regarded

as singular that gastric and duodenal ulcers are not of more frequent occurrence than they are, considering the extraordinary things people put into their stomachs.

The position of stomach ulcers.—Of more importance to the surgeon is the position of these ulcers. Statements on this point vary considerably. Robson and Moynihan have pointed out that whilst nearly all chronic ulcers, whether gastric or duodenal, occur in the neighbourhood of the pylorus, those that perforate are usually found near the lesser curvature, cardiac orifice, or on the back of the organ; and my own experience of a considerable number of cases leads me to the same conclusion. Chronic ulcers which are often of very long standing and attended with extensive thickening in the neighbourhood are very different, both in their appearance and in the secondary effects to which they give rise, to the acute ulcers which are more liable to perforate and which form the subject of my remarks to-day. A somewhat analogous condition exists in leg ulcers. The old chronic ulcer of long standing is surrounded by hard skin, and much surrounding cicatricial tissue, but the ulcer that perforates a vein and gives rise to dangerous hæmorrhage is usually small and recent in origin, and has therefore induced no thickened tissue in the neighbourhood.

The symptoms of ruptured gastric ulcer have already been alluded to in connection with these two cases, but they vary considerably. Their severity depends on the amount of intestinal or gastric contents which escape, and perhaps also on the stage of digestion at which the rupture takes place. On the latter point we need further information, but physiological investigations go far to show that certain ptomaines of an intoxicating character are produced during the digestive process, and it is but reasonable to assume that the escape of these into the peritoneal cavity may be attended with serious results. The amount of gastric contents which escape must depend partly on the size of the aperture and partly on the amount which the stomach contains at the moment of rupture. In the first of the two cases which I have related the symptoms were exceedingly acute. The aperture, as you will remember, would admit a pencil, but the amount of stomach contents which had found its way into the peritoneum was con-

siderable, and the man was considerably collapsed in consequence. It is very difficult usually to distinguish a gastric from a duodenal perforation before opening the abdomen. But the rapidity with which the symptoms come on after rupture is usually less after duodenal perforation than after gastric, I suppose because the duodenum contains less than the stomach, and also because duodenal perforations are, as a rule, smaller than gastric. The pain, too, is more often localised behind the right rectus in the case of a duodenal ulcer. When you have come across one or two cases of duodenal perforation you will realise that, though the symptoms may not be specially acute, they are often quite characteristic.

When the abdomen has been opened for either of these two conditions, the diagnosis, as a rule, presents much less difficulty. The contents of the stomach consist of semi-digested food and are acid, whilst the contents of the duodenum, as a rule, are limpid, pale, and alkaline, and remind one almost of the contents of an ovarian cyst. When I meet with fluid of this kind my attention is at once directed to the first part of the duodenum, and the ulcer is generally on its back surface, but by no means easy to close or even to get at. Duodenal contents, when they are extravasated almost invariably find their way down the right side of the mesentery into the right iliac fossa and pelvis, and thus it is that a duodenal perforation is more likely to be confounded with appendicitis than a gastric perforation is. You will remember, however, that gastric contents may run, as they did in one of the cases I have related, towards the right side of the abdomen as well. The first symptom to present itself in either of these conditions is acute pain; and shock, and is in my experience an invariable concomitant. But there are other conditions which give rise to both of these symptoms, and they must be excluded. The next point, therefore, to determine is the cause and significance of these two symptoms. Look, therefore, for another symptom which is rarely absent in these cases, viz. lack of abdominal movement. A careful inspection of the patient's abdomen affords much valuable information in all abdominal affections. In these cases abdominal movement is nearly always impaired in the region of the liver and stomach, and in ruptured duodenal ulcers more often on the right side of the abdomen than on the left. Gentle palpation will reveal a

painful area possibly very limited in extent, and usually just behind one of the recti. It is curious how soon this painful area becomes marked. Percussion, particularly of the affected area, is the next point to be attended to, but be careful not to place too much importance on this method of investigation or you may be led into error. Its value depends on the fact that gas is generated from the escaped stomach contents in the interior of the peritoneum, and the gas finding its way on to the upper surface of the liver gives rise to an area of resonance which to a greater or less extent replaces the usual area of liver dullness. In the case I have just been referring to, you will remember that not only was this symptom present when the patient was first examined in bed, but the resonant area steadily increased until the liver dullness had completely disappeared. When this sequence is observed, I am sure that this symptom is of the very greatest value; indeed, it may almost be said to be pathognomonic. You may perhaps ask me why I caution you against a too implicit reliance on the value of this symptom. I will tell you. Several years back I was asked to see a patient who had been seized with an attack of gripes, and in whom a ruptured gastric ulcer was suspected. I had not seen so many of these cases then, and finding that the liver-dullness had all but disappeared and that other symptoms of gastric ulcer were present, I confidently expressed the opinion that the case was one of ruptured gastric ulcer, and should be operated on. I opened the belly in the middle line, and found that the colon had mounted the liver and produced the above-named symptom, but no gastric ulcer could be discovered. In order to make an efficient examination of the interior of the abdomen I had to puncture the colon and let out a large quantity of gas. What caused this collection of gas I do not know. I closed the abdomen, and the patient made a good recovery, which I believe he ascribed to my skilful diagnosis, but if he did I am not sure that I should endorse his dictum.

If time permit the blood should be examined, with a view to ascertaining if there is increased leucocytosis. From 15,000 to 20,000 leucocytes per cubic mm. may be present; but they are equally likely to be found in many of the acute abdominal affections which may be confounded with ruptured gastric ulcer.

The next question we must ask ourselves is:

Could these symptoms which I have narrated to you, and which I regard as sufficient to make a diagnosis of ruptured gastric ulcer, be due to any other cause? I think it is quite possible they might. The distinction between a ruptured gastric and duodenal ulcer, as we have already seen, is not easy before the abdomen is opened.

A ruptured gall-bladder, the sudden rupture of an abscess in that region, or the sudden plugging of mesenteric veins might any one of them simulate this condition. But I think I may fairly say that, when such symptoms are present, some condition is indicated which demands immediate surgical interference. Errors in diagnosis may occur, and have been recorded by various surgeons, but I believe in all these cases without exception an operation was needed in order to save the patient's life.

Never omit to inquire into the history of such patients, and this is where the value of the general practitioner's testimony comes in, for the patient is often not in a fit state to give a satisfactory reply to your questions. In the great majority of cases there is no doubt that a previous history of indigestion exists, even if it is not obtainable at the time.

One more point. *Is it fair to say that no ruptured gastric or duodenal ulcer can get well without operation?* If we are to rely on clinical histories coupled with the presence of adhesions which we find at the time of operation or on the post-mortem table, we must admit that such recoveries are possible. They are, however, extremely unlikely to occur, and when we look at the results of abdominal section for gastric ulcer we shall all agree that it is no more justifiable to leave these patients without surgical aid than it is to permit an ordinary strangulated hernia to run its slender chance of recovery without operative interference.

Differential diagnosis.—I have just referred to some of the conditions that may simulate this condition, and I will briefly refer to a few others. Cases are recorded in which a ruptured tubal gestation has simulated perforating ulcer, and even the pain of a commencing menstrual period has been such as to cause surgeons to have recourse to abdominal exploration. The diagnosis of these cases must always be attended with difficulty, and a great responsibility is incurred, whether an operation is recommended or expectant treatment is decided

on. Even if an operation is to be performed no prudent surgeon would urge there is never reason to delay. It is rare, indeed, that the symptoms are so urgent as to demand an operation immediately the seizure has taken place, and if death supervenes within an hour or two of the onset of the symptoms it is unlikely that any operation would have saved the patient's life. It is almost invariably the case that when the patient is placed quietly in bed and warmth applied to the extremities, that the severity of the symptoms temporarily abates, as was the case in both of the patients I am now referring to. Even more marked is the temporary abatement when a subcutaneous injection of morphine is administered by the practitioner who is called in when the rupture occurs. I can recall one case, at any rate, where this was the case in which I was inclined to doubt the accuracy of the diagnosis, on account of the freedom from pain and complete absence of anxiety and shock which the patient displayed when I saw her. Her pain had been exceedingly severe on the least movement, and in order to expedite her removal her doctor had administered morphine. Partly, however, owing to the urgent representations of her medical man, whom I knew to be an accurate and careful observer, and partly in consequence of the commencing return of symptoms, I was induced to reconsider my decision, with the result that I discovered a ruptured ulcer, and the patient made a good recovery. In this case I have no doubt that the administration of morphine was a wise and happy precaution, but it is rarely called for, and may lead to an operation being deferred until it is too late to get a successful issue.

If shock is a prominent feature of the case no harm will result in the delay of an hour or more. Meantime a warm saline injection by the rectum of a pint or more will rarely fail to improve matters and afford much comfort to the patient. If recovery proceed beyond a certain point it may be advisable to delay yet longer. There is, however, as you have seen, a danger in too great delay. No absolute rules can be laid down as to the exact time to operate. It is here that the experience of the operator must guide him, and on his accurate judgment will depend the success or failure of his operation.

The prognosis is largely a matter of getting patients at an early stage of their trouble. On

this point statistics speak, and with no uncertain voice. Mayo Robson and Moynihan state that of those patients who are operated on before twelve hours have elapsed only 28 per cent. die; if operation is delayed from twelve to twenty-four hours 63 per cent. die, and 87 per cent. if no operation is performed until from twenty-four to thirty-six hours have elapsed.

Our own statistics point in precisely the same direction. Including those that have been operated on during the present year we have had in five years just fifty cases, of which twenty-three recovered and twenty-seven died. Of those that recovered only one, as far as I can make out, had been ruptured as much as forty hours before admission.

When more than forty-eight hours have elapsed since perforation occurred, the percentage of recoveries again rises. At first sight you may perhaps be surprised at this, but a little reflection will, I am sure, convince you that whether operated on or not their recovery is to be ascribed to the fact that the burst was presumably small, possibly limited by previous adhesions, and as a consequence the septic peritonitis that is set up is limited in extent and in amount.

The operative procedure which I usually employ is as follows: The patient is anæsthetised, usually with chloroform, and an incision made above the umbilicus. It is better to avoid the middle line, in order to secure a better chance of a sound scar subsequently. An incision through the sheath of the right rectus, with separation of the muscular fibres, is one of the best, but the left rectus is better in some cases. The symptoms must determine the best situation for the operation wound. As soon as the peritoneum is opened the escape of gas and the character of the visceral contents that are free in the abdominal cavity will in many cases place the nature of the case entirely beyond doubt. The front surface of the stomach is at once searched by the finger, and as far as possible submitted to ocular inspection, due precaution being taken with pads and sponges to prevent any further fouling of the intestines. It is on this surface, and especially in the neighbourhood of the lesser curvature, that perforation is most commonly found. The duodenum is next searched on its front and back surfaces, and lastly the back of stomach. If the ulcer exist in this situation, it will probably be necessary to perforate the transverse mesocolon in

order to reach it. It is well to remember that more than one ulcer may exist, and therefore not to be content with closing one ulcer only until it has been determined that no more than one exists. The direction from which the stomach or duodenal contents are flowing in the peritoneal cavity will be valuable assistance to the surgeon during his search, and often lead him at once to the ulcer, but it may be that when he has systematically searched the stomach and duodenum he has failed to find the perforation. If so, at least he can be sure it is a small perforation, and he must look the stomach over again. In one of my cases I found some stomach contents near the spleen, but could not discover the perforation, which lay between the layers of the omentum. Eventually I was directed to it by small bubbles of gas which lay along the greater curvature and underneath the omentum. Some surgeons advise an excision of the ulcer, whilst others content themselves with inverting the ulcer and closing it as far as possible by a Lembert suture. Theoretically I have no doubt that the first method is the better plan of the two. Practically I am by no means convinced that this is the case. These ulcers are in my experience so often surrounded by hardened and thickened edges that any attempt to remove them must considerably prolong the operation, and even when they have been removed it is by no means easy to approximate the edges and when they are approximated to get stitches to hold. I therefore usually content myself, as I did in this case, with bringing the edges into as close apposition as possible, and then, if it seems desirable, covering the aperture with a piece of omentum turned up for the purpose. It is not always possible to do this, for the viscera may be fixed by adhesions which render all attempts at stitching impossible. Some four or five years back I saw a case of this kind with Dr. Hayward of Wimbledon. The stomach was closely adherent at its upper part to the under side of the liver and diaphragm, and was so tightly fixed in this position that although I could pass my finger up under the ribs and feel the open mouth of the ulcer, which was large enough to admit the tip of my little finger, I was quite unable to drag the stomach down, either to look at the ulcer or to insert sutures of any kind. I therefore had to content myself with putting in a drainage-tube and stitching the lower margin of the stomach to the edges of the wound. The

aperture in the stomach, however, soon closed, presumably by adhesions which formed between it and the liver and the diaphragm. The patient made an excellent recovery and remains perfectly well at the present time.

If the stomach is full at the time of operation, it is well to wash it out from the mouth with an œsophageal tube, nothing but plain warm water being used for the purpose.

The cleansing of peritoneum is the next point to which attention must be paid when the ulcer is closed. A considerable quantity of food had found its way into the peritoneum, in the case of the patient who forms the text for this lecture. From half a pint to a pint of semi-digested food was certainly lying loose in the peritoneum and mainly on the right side. I washed out as much as I easily could and made a counter-opening just above the crest of the ilium, into which I inserted a glass drain. It is, I am sure, not only quite unnecessary, but absolutely harmful, to attempt to wash out every particle of food. It only irritates the peritoneum in the attempt to achieve the impossible. I am almost inclined to assert that the peritoneum can digest food as well as the stomach, to judge from the amount of food I have left behind on several occasions, and which has in no wise retarded recovery. But it is a wise precaution to insert a drain for at least twenty-four hours in some portion of the peritoneal cavity. If the patient is not too bad I use salmon-gut sutures, which are passed through all the layers of the abdominal wall and then suture each layer separately with catgut. If more speed is necessary I content myself with salmon-gut only. A pint of saline solution left behind in the peritoneum certainly adds to the patient's comfort by assuaging thirst, if it does not expedite his recovery, or it may be given as a rectal injection if the patient is much collapsed beforehand, or injected under the pectorals at the time of operation.

The after-treatment is of considerable importance. Nothing of the nature of food should pass the patient's lips for twenty-four hours, and if he will stand it for forty-eight hours. From a quarter to half a pint of hot water during the first twenty-four hours, coupled with three or four nutrient enemata, will give the stomach rest, and enable the healing process to be well started before the stomach is again called on to digest food. When feeding

begun it should take the form of a little beef-tea, peptonised milk, and whey. The patient should begin by taking about a couple of ounces every two hours, but not oftener, the amount being increased gradually. By the tenth or twelfth day, if all goes well, the patient will be able to take some solid food, such as puddings, boiled fish, and meat passed through a sieve. By the end of three or four weeks ordinary diet may be resumed, though it is as well to exercise some caution for a further period of time.

The exact composition of the enemata and the mode of their administration is a matter of no small moment. A raw egg beaten up with half an ounce of brandy, and with milk and arrowroot subsequently added so as to bring it up to four ounces, is one of the best nutrient enemata. It can be varied by substituting some form of wine, usually sherry, or beef-tea alone may be administered, or arrowroot with wine or brandy and a little milk. Never more than four ounces should be administered at a time, and these enemata should not be given more often than once every four hours. If a deviation from this is permitted this should only be the case where the patient is specially exhausted. Two or three ounces of brandy in twenty-four hours is a fair average amount. The rectum should be carefully washed out once or twice daily with a soap-and-water enema so as to cleanse it and rid it of all undigested residue. In some instances, where ordinary enemata are not tolerated, it is possible to keep the patient going with gravitation enemata, which are administered in the following manner. From half a pint to a pint of beef-tea or other suitable material is placed in a jug, to which a siphon is attached. To the lower end of the siphon a catheter is affixed and inserted into the anus. By means of a stop-cock or clip the rate of flow is reduced so that the fluid enters the rectum a drop or two at a time. By this plan of administration no discomfort is produced, and absorption takes place as soon as the fluid enters the rectum, because the rate of absorption and the rate of flow are equalised.

By one or other of these methods of treatment the stomach can be easily kept at rest for a day or two. Feeding by mouth can usually be recommenced after a lapse of forty-eight hours if all goes well. Those cases in which recovery takes place are rapidly out of danger, and soon pass into the stage of convalescence.

A DEMONSTRATION OF DERMATOLOGICAL CASES AT CHARING CROSS HOSPITAL.

By J. M. H. MACLEOD, M.D., M.R.C.P.,

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LADIES AND GENTLEMEN,—I intend this afternoon giving you an informal demonstration of a few of the cases which are at present under treatment here, and have selected for the purpose a series of cases which are likely to be met with in every-day practice.

Case 1.—*Late Superficial Syphilide of the Face.*

Case 2.—*Lupus Vulgaris of the Face (for comparison).*

The first patient I shall show you is a woman æt. 62 years, and her case is extremely interesting from many points of view. You will notice that on her face she has got a brownish-red infiltrated lesion, occupying the whole of the left side, extending over her nose, and spreading to her right cheek. The colour of the lesion varies in different situations, and it is browner over the nose than at the middle of the cheek. If you look carefully you will see that in the middle of the cheek there is a certain amount of scar tissue, and that the scar tissue has much the appearance of wrinkled tissue-paper. This form of syphilis is often extremely difficult to diagnose from Lupus vulgaris and it is one of the most resistant types of the disease to treat. For the sake of comparison I now show a case of Lupus vulgaris, in a boy æt. 11 years. The left cheek is the part affected, and the patch is about 3 inches long and 2 inches broad. It is brownish-pink, in colour like the syphilide.

Although the clinical appearances of the two lesions closely simulate one another, there are several points of difference which I should like to indicate, and to emphasise by a comparison of the two cases. The first point of difference between the two conditions to which I wish to call your attention is a certain degree of difference in the colour. The colour of the woman's lesion is, if anything, more coppery; there is a certain amount

of yellow-brownish colour in both cases, but the lupus is usually the browner of the two. With strong daylight you would at once appreciate the difference. It is unwise, however, to rely absolutely upon the colour, and there is another valuable aid to the diagnosis, namely, the duration and course of the lesion. This woman has had the disease in her face twenty-five years, and she has never had any treatment till eighteen months ago, when she came under the care of my senior colleague, Dr. Galloway; and she has had no local treatment whatever. You will notice that her lesion has scarred and that this has occurred without treatment. Lupus, on the other hand, may break down; it may ulcerate, but it never forms a scar of itself. This boy's lupus looks well because he is under constant supervision and treatment by Finsen light, but when I commenced treatment the patch was covered with a sero-purulent crust and was ulcerated in places. Any scarring which may be present in a patch of lupus is the result of treatment, whereas the scarring in the syphilitic lesion in the woman's case is due to the involution of the disease itself. Now as to the history of the two conditions. Such a lesion as this is never an outcome of secondary syphilis; it is a late manifestation of the disease. On the other hand, lupus begins in very young children; the subject of it at the commencement is rarely over 14 or 15 years of age, and the majority of cases begin under ten years.

I wish next to say a word as to the treatment of the two conditions. First of all with regard to the syphilitic lesion. The patient has been under more or less constant treatment here for the last eighteen months and has considerably benefited from it. At first, the patch was more raised and angry-looking than it is now. As the result of treatment it has become paler and has flattened down, and she feels much more comfortable; still, as you can see, it is very far from being cured. To appreciate the line of treatment permit me to revert briefly to the vexed question of the pathogenesis of the disease. As you know, the modern idea with regard to the cause of syphilis is that it is due to a specific microbe, in the same way as is tuberculosis; but though a number of microbes have been from time to time put forward and claimed to be specific, none of them has yet been established. The microbic theory is by far the most

workable hypothesis; its infectivity and its progress all point to the same conclusion. Supposing we provisionally adopt the microbic theory: what happens in such a case as this? At the end of the period when the secondary eruption dies down the microbe of syphilis goes, as it were, into winter quarters; in other words, it becomes latent in the tissues. It may remain there for years. This woman may have had syphilis when she was comparatively young and may have had profuse early secondary symptoms. Then she had a long period of quiescence, during which the microbe became latent and did her no harm. Then suddenly, for some reason or another, possibly a general disturbance of health, the microbe suddenly became active again, manufactured toxins, the tissues reacted to them and the present lesion resulted. The microbe was probably hanging about the veins and in the fixed tissues round the veins, and then suddenly set up reaction in the skin. The reason of my referring to the matter in this detail is simply this, that there is a prevalent idea that the iodides are capable of causing a resolution of these late syphilides. Now, iodides by themselves will rarely, if ever, cure a lesion like this. Why? Iodides may remove the infiltration, but they are unable to destroy that which is causing the infiltration. You have still to deal with some active virus, which can only be effectively combated by means of the drug which seems to be a specific in syphilis, namely mercury. Consequently it is inadvisable to give iodide of potassium or sodium alone in these cases: it should be combined with mercury, and it is probably the mercury which does the most good. What is the best way of combining these two drugs? In this woman's case several different methods have been tried. Perhaps the most commonly adopted plan is to prescribe the mercury in the form of the Liq. hydrarg. perchlor. in a mixture with the addition of so much iodide of potassium, 20 m of the liquor to 10 grains of the iodide. With this mixture the results are often disappointing, and the best value is not obtained from either drug. It is better to prescribe them separately. The iodides act best when given in fairly large doses—at least ten grains three times a day, and taken with a large amount of water, three or four pints daily, so as to flush out the patient. In several of the cure establishments

for the treatment of syphilis, an important factor in the course is the large quantity of water which the patients have to drink. The mercury should be given separately, and one of the most convenient ways is to prescribe it in the form of Hyd. cum cret., two grains, with a grain of Dover's powder in the form of a pill, to be taken twice daily. There is a method which is very convenient in cases of tertiary syphilis, and that is the use of the biniodide of mercury, $\frac{1}{10}$ grain in a pill with 5 grains of iodide of potassium. The patient should take one pill before each meal and one at night; but this is not so certain as the taking of the two drugs separately.

With regard to the boy's case, I do not wish to-day to enter into the details of the treatment of lupus. I would only remark that there is no superior method at present when judiciously employed than that devised by the late Dr. Finsen. The only method which runs it close is that by the Röntgen rays, but these rays are dangerous even in the hands of experts and you do not want to use them oftener than necessary. Moreover I do not think the results are as good. There is perhaps the advantage in the Röntgen rays that you can treat a larger surface at once. Still, by repeated exposure to the Finsen light a greater penetration is obtained than with the X-rays, and deep-seated foci of the disease are more satisfactorily dealt with. This boy has been under treatment for a long time, and treatment by this means is always a long process, but it leaves a healthy scar and the minimum of disfigurement. We shall probably have to continue the treatment for another six months before the cure is complete. There is one very important point which it is well to emphasise as much as possible with regard to ray treatment. These methods are very useful, but they should be looked upon as adjuncts to the treatment and not put on a pedestal and regarded as an infallible cure for this disease and the only reliable method. The best results are obtained by judiciously combining the ray treatment with surgical procedures, plasters and the like. There have been one or two cases here in which one form of treatment has been persevered with throughout, but they have been done with the idea of finding out how long the individual treatment would take. Our routine treatment here is to combine various methods according as they are

indicated. For example, we are in the habit here of cauterising with the actual cautery the deep-seated foci of disease scattered through the patch after the superficial infiltration has been removed by the Finsen light; and in this way time is saved, and if a fine-pointed cautery be used little or no extra scarring results. The apparatus we employ is one of the most recent types of Finsen lamps and is known as the Finsen-Reyn lamp. The original large Finsen lamp is probably the best of all, as it penetrates deepest, but this lamp gives almost as satisfactory results. The patient's skin is rendered anæmic by pressure with a double lens through which water is circulating. The effect of the exposure to the light is to produce a certain amount of reaction in about twelve hours, and in association with the reaction you find an improvement in the disease, but the rays have also a direct action on the diseased tissue.

Case 3.—Ringworm of the Scalp, under X-ray Treatment.

The next case I wish to demonstrate is that of a little child who is the subject of ordinary small-spored ringworm of the scalp. The reason I bring it before you is that it is under treatment with the X-rays. You know the great difficulties in the treatment of ringworm. It is one of the most chronic and difficult diseases which the practitioner, and certainly the dermatologist, is called upon to treat. Our usual practice in such a case is to have the head shaved and then to rub in an irritant ointment containing equal parts of carbolic acid and Unguentum hydrarg. nitratis and Ung. sulphuris. This application is painful and does little good unless it produces a certain amount of inflammation and oedema. The hairs then become loose, and if we can manage it we have those hairs epilated. But the procedure is a painful one, and the cure in an extensive case may occupy a year or more before the last traces of the disease are removed. In the X-rays we have an effective method of combating this intractable affection, and one which occupies less time in curing it than any other method with which I am acquainted. The proceeding is very simple. We expose the head to the X-rays until such time as we have produced the very faintest degree of inflammation and then the hairs all come out. This may be done at one long sitting or with several short ones with a

weaker current. During treatment the scalp around the diseased patches is rubbed with a mercurial ointment to limit the spread of the disease. After the hairs have fallen out the ringworm is practically cured and a bald patch is left. About six weeks later the hair is found to be growing on the patches. I consider this method to be of very great practical importance, especially in institutions where a number of cases have to be dealt with, and where the time taken in the treatment is of consequence, as by it the period under treatment may be shortened to a few months.

I will now demonstrate the method here used. The vacuum tube is placed in a lead glass protective shield with a window; from this a cylinder about 7 inches long of the same material passes to the patient. The lead glass is opaque to the X-rays and consequently makes the process absolutely safe. Formerly it was necessary to cover the whole surface of the patient with lead, making a small aperture where you wish the rays to act. The cylinder enables one to keep the scalp at a fixed distance from the vacuum-tube. You know that not only do we get potent rays from inside the tube, but round it there is an electrical effluvium which is effective for several inches beyond the tube, and it is necessary to have the patient clear of that. A fact of importance also is that we have thus a means of protecting the operator also, a matter which has not received enough attention hitherto, and there is little chance of his getting X-ray dermatitis from his work. The next point of interest is that we are now beginning to realise the necessity of as far as possible measuring the dosage of the rays, and of recognising the fact that the effect of the rays on the tissues is cumulative. Now this most important problem of all has been solved, and by means of a special galvanometer which is not influenced by the coil, and is inserted in the secondary circuit between the coil and the X-ray tube, the exact milliampérage of current which is going through the tube can be measured, and we know that the amount of irradiation from the tube is proportionate to the amount of current which is passing in that circuit. We can therefore record that the child has had such and such a dosage of X rays. At present we are measuring the rays by means of this instrument, which is known as a radiometer, but we hope to have a galvanometer fitted in the near future.

4.—Case of *Lichen Planus* of the *Hypertrophic Type*.

Here is a patient whose case is of some interest. She is aged about 50, and she has on her hands an eruption of hypertrophic Lichen planus. My reason for bringing the case before you is that the lesions might be mistaken for some granulomatous affection, such as a late syphilide. It is the backs of her hands which are affected, and the lesions consist of raised roughened patches, violaceous in tint, and presenting on the surface a rough scaliness which is very adherent, and gives the appearance of a sort of bloom. Lichen planus is a mysterious disease, and this is an unusual type of it. It was first carefully described by Erasmus Wilson about 1870, and it seems to have attracted more attention and been more prevalent in this country than in the continental clinics. You are doubtless familiar with the ordinary type of Lichen planus, which is a disease made up of patches of small angular papules about the size of a pin's head, and of violaceous tint. The lesions are often found on the arms, wrists, inside the knees, and the ankles. The lesions may coalesce or individual lesions increase in size to form large raised patches, as in this woman, and sometimes the patches become warty. On the other hand, they may involute and leave a certain amount of atrophy surrounded by a pigmented halo. So the disease is a multiform one. The atrophic form of it has attracted considerable interest lately, especially on the Continent, and Professor Hallopeau, one of the French physicians who recently visited London, named it Lichen planus atrophicus. The mucous membrane of the mouth is frequently affected in this disease. The etiology of the affection is unknown, but it is believed to be connected with the nervous system. Cases have occurred in which the disease has come on after serious mental trouble, anxiety, and worry. It often appears in people who are neurotic; it has sometimes come on after injury to the nerves. So in a vague way there is considerable evidence of its connection with the nervous system. One gets little or no help with regard to its causation from its histo-pathology; and we are not much farther on in understanding of its true nature than we were when Erasmus Wilson first described it. With regard to its treatment there are few diseases in the whole realm of skin-

affections in which you have to remember more carefully that you have a patient behind the disease than in Lichen planus, and to get a case of Lichen planus well you have often to forget about the skin disease, and treat the patient. You will probably find that the condition has developed at a time when the patient was full of anxiety or over-worked, and if you cannot take him away from his surroundings, or in some way lessen his mental strain, you will find it difficult to get him well. You may find there is some obvious disturbance of the general health of the patient, and that has to be dealt with according to general principles. Arsenic is regarded by several experienced physicians as a valuable internal remedy for the disease, but the results from it are often disappointing. With regard to local treatment, as the condition itches a good deal, and the irritation is sometimes so great that the patient is unable to sleep, soothing treatment is usually indicated. It is a condition which you can sometimes aggravate by the injudicious application of irritating ointments in the first instance. It is necessary to begin with mild remedies, such as bran baths, alkaline baths, and so on, together with antipruritic lotions, etc., until you have ascertained the degree of tolerance of the patient. Certain of the cases can tolerate strong local application, as this woman does, and considerable benefit may be derived from ointments containing salicylic and even chrysophanic acid.

5.—*Rodent Ulcer treated by Radium.*

The next patient is a woman with a small rodent ulcer, which I have treated entirely with radium, and in which the ulcer has almost completely disappeared. It is a curiosity. The ulcer was on the face, near the nose, and it has healed up in the centre, and all that remains of it is the resistant cartilaginous border, which is still under treatment. The treatment of small rodent ulcers by radium is simple, convenient, and effective. The radium is placed in a small glass tube, in the cradle, and we fix cradle and tube together on to the part. The result is that in about twenty-four hours we get a certain amount of reaction and inflammation. She has had in all nineteen exposures, sometimes of twenty minutes at a time, sometimes of an hour, the period of time depending on the amount of inflammatory disturbance which is

present, as it does not seem essential to produce a marked reaction. She has exposures once a week, as she comes from a distance. The radio-activity of this sample of radium has been estimated as being over 1,000,000, taking the radio-activity of uranium as the unit.

6.—*Case of Acne Vulgaris.*

Here is a case of ordinary acne which is of considerable interest. The patient is an adult male and his acne has been greatly aggravated by his having taken a patent blood mixture containing iodide of potassium. It will be a difficult case to cure, and it would not have got into that state had it not been for the abuse of the iodide of potassium in that patent medicine.

The first essential in the treatment of the case is, of course, to stop the iodide mixture. The local treatment consists in opening the pustules, squeezing out the contents, fomenting the face with boric fomentations and rubbing in a mild antiseptic ointment containing a large percentage of powder. There is no necessity to employ strong antiseptics, as even they will not penetrate down to the depths of the pilo-sebaceous follicles, and mild ones, such as sulphur or boracic acid, are capable of destroying the pus-forming micro-organisms. The milder the antiseptic you can use on the skin, provided it is adequate, the better, because mild ones do not injure the skin in the same way as the strong ones do.

7.—*Case of Rodent Ulcer treated by X-Rays.*

The patient was a man of middle age and the rodent ulcer was about the size of a sixpence and situated on the right side of the nose near the inner canthus. He has been treated by the X-rays and the ulceration has all gone, and the lesion has been replaced by a smooth shiny scar somewhat depressed in the centre. He has had about a dozen exposures to the rays, and in order to hasten the treatment the rolled edge was ironed round with the actual cautery at a dull red heat. The result is a good one. It is in this type of case, where operative treatment would have caused traction on the eyelid and probably ectropion, that the X-rays are specially indicated.

8.—*Case of Lupus Erythematosus.*

The next patient, a woman, suffers from Lupus

erythematosus, affecting the face. She was treated elsewhere with X rays at the time when the dosage was not considered of so much importance, and before the cumulative effect was realized. The result has been that the Lupus erythematosus has been transformed into a most disfiguring scar covered with telangiectasis. There is a certain amount of Lupus erythematosus left, and we have been trying to get rid of it by exposure to the light at a short distance from the lamp, and of the telangiectasis by electrolysis, but so far with doubtful success.

9.—*Case of Mild Ichthyosis and Eczema.*

The last patient I wish to demonstrate is a boy who suffers from a mild degree of ichthyosis with a chronic eczema superimposed on it. In ichthyosis the horny layer of the epidermis, which is the protecting layer of skin, is defective, and children born with this type of skin are liable to become eczematous and their eczema is unusually resistant to treatment.

In some of these cases distinct benefit is to be derived from taking thyroid extract and applying emollient creams containing glycerine of starch and vaseline with the addition of boric acid, 10 grs. to the ounce.

In conclusion, gentlemen, I am indebted to my colleague Dr Galloway for giving me the opportunity of demonstrating several of his cases, which have been a valuable addition to those under my own charge.

Saline Infusion in Puerperal Infection.—

Jaworski presents data which unmistakably establish the favourable action of saline infusion in puerperal infection, showing that the course is modified for the better and the patient displays slow but constant improvement. In order to be effectual the emunctories must be still functioning. When the kidneys and the glands are no longer working properly, then saline infusion can do comparatively little good. A large amount of fluid should be removed from the intestines or the blood pressure should be reduced by venesection. In this way the body is freed from a certain amount of toxins, the blood pressure is reduced, and the diffusion of the artificial serum through the vascular system is favoured when it is injected later. In the chronic forms of puerperal infection, saline infusion is especially valuable, on account of its stimulating, cleansing, and eliminating action.—*Journ. A. M. A.*, vol. xliii, No. 27.

DEATHS IN ANÆSTHESIA IN CHILDHOOD.*

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MR. PRESIDENT AND GENTLEMEN,—In discussing the question of death during anæsthesia in childhood, I shall try, as far as possible, to avoid the overlapping which would so easily occur between my remarks and those dealing with the surgical aspect of sudden and unexpected deaths. For this reason the question of surgical shock, which as a matter of fact plays a large part in many of the cases which we ought to consider, will be, wherever possible, left on one side. It is necessary to state also, in order to clearly define the kind of case that should be here discussed, that I do not include any instances in which the patient's condition is serious before the administration of the anæsthetic. I propose, in fact, to limit my remarks to the discussion of cases in which a child succumbs during anæsthesia who was quite healthy except for the condition on account of which operation is undertaken, that condition not being one that has produced serious alteration in the child's general health. It is obvious that no more deplorable accident could be imagined than an utterly unexpected death in a healthy child undergoing a slight operation. And for this reason, if for no other, I think the Society is wise in discussing the question of children's deaths from anæsthetics as well as from purely surgical and medical causes. Moreover, these deaths are doubly terrible in that they are in most instances preventable. Yet they are far from uncommon, though their frequency can naturally enough not be gauged from the frequency of their publication. Yet, even with the natural reluctance that a practitioner would have in attributing the death of a healthy child solely to his anæsthetic administration, the Registrar-General's annual reports furnish us with a number sufficiently large to show the real importance of the question. And it must be always borne in mind that these reports, excellent though they are, probably greatly understate the case. Without going into elaborate details

* A Paper read before the Society for the Study of Disease in Children.

the figures, very kindly furnished me by Dr. John Tatham, show that in the four years 1899-1902 there were registered deaths in children under 10 years of age: From chloroform, 52 cases; from ether and other anæsthetics, 18 cases; in England and Wales (70 cases). In the five years 1899-1903, there were 59 deaths, nearly 12 in a year, from chloroform in children under five years of age only. These figures, which understate the facts, and which largely represent avoidable calamities, are surely serious enough.

Now, there is one difficulty in adequately discussing this subject that at once presents itself. This is the fact, a fortunate enough one from other points of view, that any one individual anæsthetist's experience of such cases as we are concerned with is very small. Few of us happily can talk from any experience at all wide of unexpected deaths in children under anæsthetics. The reason for this is of course that the majority of these deaths occur in the practice of junior officers of children's hospitals, and of practitioners who have comparatively rare opportunities for giving anæsthetics to infants and young children. And I may perhaps remark here that there is no class of case where a large experience is more necessary than in the case of infants. In no kind of subject is the difficulty of exactly estimating the patient's condition greater, nor is there any in which when a serious operation is to be performed the observation and skill of the anæsthetist is more severely taxed. This is an opinion which was formally stated, too, by our Secretary, Dr. Cautley, when, in conjunction with Mr. Clinton Dent, he discussed the subject of congenital pyloric stenosis at the Royal Medical and Chirurgical Society.

Now, the death of a healthy child during anæsthesia takes place apparently at one of three periods.

Firstly, the child may die before true anæsthesia is established and before any operation has been begun.

Secondly, death may take place in the course of an operation, anæsthesia being fully established, and the operation not being responsible by shock or hæmorrhage for the fatality.

Thirdly, death may take place at various intervals after the withdrawal of the anæsthetic.

With regard to the first class of case in which the child dies before the anæsthesia is established, the

explanation of the catastrophe is no simple matter. In the case of chloroform we are all familiar with the fact that the early stages before the advent of complete unconsciousness are the most dangerous. Exactly why this is so is not so certain. Two explanations are commonly offered. According to one the death is due to *vagus* inhibition of the heart, the *vagus* excitability being declared to be greatly enhanced during the early stage of chloroform inhalation. The other explanation declares that it is the temporary respiratory interruption due to spasm of muscles that is primarily responsible, this stoppage of breathing leading to dilatation of the right side of the heart, imperfect elimination of chloroform from the lungs, and consequently continued action of the chloroform upon the musculature of the heart, which is already embarrassed, as we have seen, by the respiratory interruption. A vicious circle entailing poisoning of the heart-muscle by chloroform is thus established. However the truth may be as regards the way in which these deaths are brought about, at any rate they occur with terrible suddenness. Moreover, there is as far as I know only one absolutely certain way of avoiding them. That way I shall allude to later. The remarkable feature about these cases is that they do not occur except in the case of chloroform. It might well be supposed that to suddenly and forcibly present a strong and irritating vapour to an infant or young child's mouth for inhalation, and to keep it there, would be a proceeding likely to cause dangerous reflex cardiac effects, even if an actual asphyxial state did not supervene. Yet in the case, for instance, of ethyl chloride such an experiment is constantly being performed without untoward result, and the same may be said of ether. Such a proceeding is, of course, never adopted in the case of chloroform and would entail many deaths. And the cause of the early deaths that occur with chloroform cannot, I think, be always attributed to an approach to this sudden and air-excluding method of anæsthetising. It is not I mean, at all clear that these early deaths are due simply to the exhibition of too strong a vapour. There are cases recorded occurring in experienced hands where it is as certain as such facts well can be that only a very dilute chloroform vapour has been offered for inhalation. Yet within a few breaths the patient has expired. The exact physiology of these syncopal deaths is not even now, in

spite of much excellent, if highly controversial, research and writing, absolutely clear. The one fact that stands out both in the physiological laboratory and in the operating theatre is this, that it is with chloroform alone that these deaths occur, almost without exception. And this fact brings us to discuss the interesting question of the part that fright and terror may play in bringing about fatal syncope before operation.

It is well known that in the pre-anæsthetic days patients died in this way before the knife had touched them, as well as with the shock of the first incision. The latter kind of shock we know to be avoided by proper anæsthetisation. But what about those who died of terror before they were touched? Why, it is said, should not patients die in this manner now, and are not some of these early deaths instances of fatal shock from mental emotion? It may be so; but we have to explain why such terror has never proved fatal when nitrous oxide or ether was the anæsthetic to be used. Whether children are more or less likely than adults to be unfavourably influenced towards the anæsthetic by fear is a point that the Society may well discuss. It is one, at any rate, both of practical and psychological interest. Young children are in their behaviour towards anæsthetics much more analogous with the lower animals than are grown-up people. The lower animals, and birds I believe in particular, are prone to die of fright. Therefore it might be argued that children are more likely to die in this way too. As a matter of fact, in practice it is more essential with a child even than with an adult to gain the patient's confidence and put him at ease and free from fear. The personal equation, in fact, in securing safe and satisfactory anæsthesia comes into play most markedly.

The *second* division we have made contains those instances in which death occurs from the anæsthetic during complete anæsthesia, when operation is proceeding; and obviously it might be argued that these are never purely anæsthetic deaths. When, however, the operation is one not involving important structures or large nerves or much hæmorrhage, when, in fact, it is what is called a minor operation, it is but fair to consider the anæsthetic responsible for the calamity. Now these deaths are, strictly speaking, never quite sudden. Their apparent suddenness is due to gradual

failure of respiration or of pulse not being appreciated till the moment comes of absolute cessation, and the child is thought to have suddenly died. These are the cases of which it may be said that they should never occur at all. They are the kind that never do occur to those who are constantly handling anæsthetics and children. The symptoms may, however, be so slight till danger is reached and the child's behaviour under anæsthetics may be so misleading that it is easy to understand their occurrence in other hands. These deaths are due to the direct toxic effects upon the vital centres of the anæsthetic drug used. In the case of ether it is practically speaking only possible to produce death in this way by the combination of some asphyxial influence; and the presence of this increasing asphyxia may not be readily obvious to the untrained.

The *third* kind of death is that which occurs after the anæsthetic has been withdrawn. When it takes place within a very few minutes, up to five or perhaps even ten for instance, the fatality in these cases is due to the continued action of the drug which, though inhaled some minutes before, had not yet been carried from the lungs by a failing circulation in sufficient quantity to exert its deleterious effects upon the heart or upon the medulla. In other instances of death after an anæsthetic and before the return of consciousness, the commencement of vomiting with inhalation by a still insensitive larynx of matter forced up into the naso-pharynx has been the direct cause. Such an accident occurs easily in the case of an infant who has been fed with milk too soon before an operation, the curd from the stomach proving the fatal body.

Nothing has so far been said as to whether there is any particular kind of patient in whom, though apparently healthy, death is more likely to occur than in others. Of course there are conditions which, though not evident without special examination, are yet highly prejudicial from the point of view of anæsthetics. Deaths have resulted in such cases, and post-mortem examination has disclosed the contributory cause. Of this nature, for instance, was the death that happened under nitrous oxide in the case of a boy who had extensive mediastinal glandular disease with actual pressure upon the trachea within the thorax. These cases, however, do not strictly come within the category we have

laid down, because the patients are not in a state of ordinary health, although they may appear to be so to a superficial observation. Of an allied nature, perhaps, are the cases of the so-called "constitutio lymphatica," which some authorities consider so grave a condition in connection with anæsthetics.

Attention must be drawn to the fact that many of the deaths occur in connection with slight operations, particularly circumcision and removal of adenoids. These operations of course form a large proportion of the cases in which very young children undergo operation. Had time permitted I should have liked to enter upon the question which is, after all, of the greatest practical importance—viz. that of the prevention of these catastrophes. I cannot, however, do more in this connection than suggest the following propositions for the consideration of the Society:

(1) That the opinion is too widely held and acted upon that in the very young chloroform is the only suitable anæsthetic.

(2) That in cases of circumcision, when complete unconsciousness has been obtained, the anæsthesia should afterwards be kept to a very light degree only. It is better that the nurse should have to control one thigh than that artificial respiration should become necessary.

I believe that even if these two simple indications were generally acted upon, a considerable decrease in the mortality of healthy infants under anæsthetics would at once result, "a consummation devoutly to be wished."

I thank the Society for the attention with which they have listened to remarks that are necessarily but incomplete, and that are likely to have appeared to many to border upon the commonplace.

Connection Between Nose, Throat, and Genitalia.—Freund's later researches have confirmed his announcements in respect to the relations between the female sexual organs and the nose. In sixty-six out of 100 pregnant women he found hyperemia of the throat and hypertrophy of the turbinals, generally of the lower. These findings persisted throughout the pregnancy and were accompanied by epistaxis in 25 per cent. During the birth act the turbinals swell and induce reflex phenomena in the respiratory organs.—*Journ. A.M.A.*, vol. xlv, No. 2.

SOME HEALTH RESORTS IN FRANCE.

No. II.

Évaux; Mont-Dore.—The party of medical visitors left Nérès on Sunday morning, September 4th, and arrived in their special train at Évaux about noon, where carriages were waiting to take the travellers to the bathing establishment distant about a quarter of an hour's drive from the railway. After luncheon had been served and addresses of welcome had been delivered by the notable men of the district, a tour of inspection was made. Évaux has about eight sulphate of soda springs varying in temperature from 60° to 140° F.; their use is chiefly by external application, and they are especially indicated in lymphatic cases suffering from muscular and articular rheumatism. Patients are also treated here for respiratory troubles and scrofulous ulcers. *Confervæ* are found in these springs in abundance floating on the surface of the wells in a thick scum of a greyish-green colour. The scum is used for local applications; it contains bromine and iodine, and gives a certain feeling of sliminess to the water. The season for treatment at Évaux lasts from June to October, and accommodation is thoughtfully provided for people of slender means, a course of twenty-eight days costing only eighty francs. Évaux lies in beautiful mountain scenery and presents a most attractive appearance.

Mont-Dore.—The special train left Évaux at four o'clock in the afternoon, and arrived at Mont-Dore about eight, after an interesting journey through rugged and precipitous gorges. This somewhat fatiguing but enjoyable day concluded with a banquet given in honour of the medical visitors at the Hotel Sarciron, followed by the opera "Yetta" at the Casino. Monday, September 5th, was a busy day; before eight in the morning the Bathing Establishment was being inspected by the party, and at ten o'clock Professor Landouzy began his lecture. Luncheon was served at noon, and afterwards there were excursions to the different points of interest in the locality. In the evening there was a complimentary dinner, followed by the production of the opera "Lakmé" at the theatre. The virtues of the hot springs of Mont-Dore and its splendid bathing establishment are so far-famed, and so fully described in numberless pamphlets and books of reference, that it is unnecessary to go into minute details in regard to this renowned health resort. It is well, nevertheless, to emphasise the fact that most benefit is derived by gouty or rheumatic patients, especially those with congestive or spasmodic forms of respiratory affections. The season lasts from June to September.

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A CLINICAL LECTURE

ON

CHOREA.

Delivered at the Hospital for Sick Children, Great Ormond Street, W.C.

By ARCHIBALD GARROD, M.D., F.R.C.P.,
Physician to the Hospital for Sick Children, and Assistant
Physician to St. Bartholomew's Hospital.

LADIES AND GENTLEMEN,—I propose to begin by showing to you some cases of chorea which are in the ward, and after we have noticed their clinical features we will adjourn to the museum and there discuss our subject more fully. We shall in this way avoid exciting the patients by lengthy discussions and examinations at the bedside, which in cases of chorea is a matter of no little importance, especially when we have to do with cases of a severe type.

The first case which I am able to show you is that of a girl *æt.* 11 years, who is suffering from chorea of very slight degree. You will notice that the expression of her face is not in any way peculiar. She exhibits choreic movements of the most ordinary kind. In this case the affection is more marked on the left side than on the right, and it illustrates the hemiplegic character which chorea usually assumes. The child has had chorea twice before, but has no organic heart trouble. Her heart is not dilated, and she has no murmur, but its action is somewhat irregular. The knee-jerks are almost completely absent. The onset of the first attack was supposed to have been determined by a fright when she was seven years of age. She was eight years old when she had the second attack. In this case there is no distinct rheumatic history.

The second child has a slighter degree of chorea even than the last, and she is rapidly recovering. Her present age is 9 years 4 months. She has an oscillating temperature, as such children often have. She has a feeble knee-jerk on the left but

none on the right. The important feature in this case is a very obvious heart complication. If you listen at the apex you will notice that there is a systolic murmur, followed by what appears to be a reduplicated second sound, but the reduplication of the second sound is only heard at the apex, and the second of the two sounds is really a mid-diastolic murmur, significant of mitral stenosis and limited to the apex as mitral stenotic murmurs always are.

The next case also illustrates the tendency of chorea to be more marked on one side of the body than on the other. It is a new case, of which I have not yet had an opportunity of making a thorough examination, and I have not yet become acquainted with the patient's history. This child is much more emotional than the others whom we have seen. The emotion manifested may be of a cheerful or of a doleful variety, but the transition from smiles to tears is very easy in choreic children. On testing the knee-jerks of this patient you will notice that they have the peculiar character which is so often spoken of as "hung up." That is to say, the response is of the nature of a choreic movement: the contraction persists for some seconds and then suddenly relaxes. The choreic movements are well marked in the face, but the same movements are not repeated over and over again, as is the case in what is known as habit chorea, a condition which has nothing in common with true chorea. In this case there is a very faint systolic bruit of the cardiac apex.

The next case, which is in a boy, is a very bad one, and we will merely glance at him. Notice the vacant look in his face; there are constant active movements and his face wears a mask-like, expressionless aspect. This boy has not spoken for some ten days past. Notice also the redness of his knuckles and elbows and other prominent parts, which is due to friction against the bedclothes. The child is now decidedly better than he was a short time ago; the movements are much less and he is sleeping now and taking his food well, which are very important points. In his case, severe as it is, the heart trouble is quite slight; indeed, there is no serious heart implication at all, and the severity of the case does not consist in the gravity of the rheumatic element. Having thus led you upwards from very slight cases to one of what may be styled chorea gravis, I propose to discuss the

points which have been raised in more detail elsewhere.

* * * *

For clinical purposes there are three great factors to be considered in cases of chorea. In the first place, and most obvious of all, are the choreic movements, which are more or less ataxic, and which do not repeat themselves more than once or twice in succession, but affect now one and now another group of muscles. I lay some stress upon this point, because, as you are well aware, in conditions which simulate chorea, such as that known as habit spasm or habit chorea, the same movement is repeated over and over again, as, for example, a peculiar jerk of the head or twitching of the face. The movements of chorea may be of any degree; in some cases they are very pronounced, so that, as one was able to show you to a slight extent in the worst of the cases which we saw upstairs, the patient actually knocks himself about, and may so rub the prominent angles of his limbs, such as the elbows and ankles and knees, that he produces excoriations or redness of the skin. Sometimes, on the other hand, the movements are very slight indeed, and may not amount to more than occasional twitchings. Such slight choreic movements are very common indeed in rheumatic children; indeed, they may usually be observed if carefully looked for; and from such trifling movements up to cases of chorea gravis you have every grade of severity. One of the special features of the choreic movements is that they tend to be more or less unilateral. It is not common to have choreic movement entirely confined to one side, but as a rule they are merely more conspicuous on one side than on the other. This tendency to a hemiplegic distribution is of some importance, as it suggests that chorea is the result of a local cerebral lesion, rather than that it is due to some toxin produced by the rheumatic micro-organisms. If the symptoms were of toxic origin, one would expect them to be always bilateral and equal on the two sides of the body.

The second factor which calls for mention is weakness of the affected limbs. In ordinary cases of chorea that is not at all a conspicuous symptom. If, however, the grasp of choreic children be tested, it will usually be found to be weaker than normal, and moreover to be weaker on the side upon which the choreic movements are more active. The weakness is sometimes more apparent than

real, and may be due to the fact that when the child attempts to grasp the hand, choreic movements are set up, and the muscles are not brought into work to the greatest advantage. However, a certain degree of loss of power, paresis, is the rule in chorea, and in some cases it becomes a very prominent symptom. Some of you will probably call to mind cases of what is known as paralytic chorea, in which the inco-ordinate movements are very slight indeed, and were perhaps not noticed at the first glance, but in which there is a loss of power in the legs, or a hemiparesis which attracts attention at the outset. Such cases are sometimes admitted into hospitals as examples of paraplegia or hemiplegia; and the possibility that a case of apparent hemiplegia in a child may be an example of paralytic chorea has to be reckoned with in attempting to diagnose the cause of such a condition. However, it is only exceptionally that so conspicuous a degree of paralysis is met with. This will be a convenient opportunity of speaking of the knee-jerks in chorea. In the cases which you saw just now I was not able to show you the really characteristic knee-jerk of chorea—I refer to what is usually called the “hung-up” knee-jerk. When the patellar tendon is struck with a percussion hammer or with the finger the limb responds; but instead of the ordinary momentary response the leg is held up for an appreciable interval and then drops suddenly, as if the blow on the patellar tendon had started a choreic movement which is sustained for a short time.

A response of this character is, I believe, only seen in cases of chorea, but it is by no means seen in all cases of chorea. The least common variety of knee-jerk in this disease is an exaggerated one. Much more commonly it is diminished, feeble, or absolutely abolished. In the course of the disease the knee-jerk may disappear suddenly; and this, again, is a matter of some slight clinical importance; for, as you know, arsenic is often prescribed for patients suffering from chorea, and it is apt to be assumed, when the knee-jerk disappears, that its disappearance has been due to the arsenic which the patient may have been taking for some time. It is well known that arsenic may cause neuritis and disappearance of the knee-jerk, but, on the other hand, chorea may produce the same result apart from the administration of arsenic. Not long ago we had in Alice Ward two children with

chorea lying in adjacent beds. One child was taking arsenic, but the other was taking no medicine at all. In both of them, during the course of the disease, the knee-jerk disappeared.

A very important factor in chorea is emotional disturbance. It is often most prominent in children who have recently been admitted into hospital, and who have not yet settled down and become used to its surroundings. It is also apt to be prominently manifested at the visit, when the child is conscious that it is the centre of attention for the moment. The emotional disturbance assumes various forms; some choreic children will weep when you look at them, others will laugh or smile; and indeed it would be possible to classify the cases as examples of smiling and weeping chorea. In the slightest cases of all the emotional element is very little seen; in the worst cases, on the other hand, it becomes extremely pronounced. I mentioned just now that when the patient is looked at or when attention is directed to him the emotional disturbance is apt to become more pronounced, and very slight exciting causes will produce very conspicuous emotional storms in such children. And this suggests a very interesting question. You know it has often been stated that fright is an important exciting cause of chorea. It may be that it is so, but it is not very easy to understand how this can be the case. I myself believe that the initial fright is very commonly a result of the chorea, and that if one were to investigate the cases with great care, it would be found that the initial choreic symptoms could be traced back beyond the fright which was supposed to have excited the disease, and that the emotional instability which is part of the chorea has been the cause of the fright. The fright described is often produced by a very trifling cause. I can recall a particular case of the kind in which inquiry showed that the child was noticed to “drop things” some hours before the fright to which the onset of the disease was ascribed. “Dropping things” is one of the commonest of the initial symptoms of chorea; and there can hardly be any doubt that in the case in question the child was already choreic before it received the fright which was supposed to have been the exciting cause. From the lesser emotional disturbances referred to up to actual mania every degree may be met with. Mania is more commonly observed in connection

with chorea occurring after childhood; the older choreic patients are more liable to acute mental disturbance than are young children. One peculiar feature which I had occasion to mention in connection with the severe case which you saw upstairs is cessation of speech. This is not an uncommon symptom in severe cases, and the return of speech usually accompanies a general improvement in the patient's condition.

The next factor which calls for mention is the rheumatic or cardiac factor. We may speak of it for our present purposes as the cardiac element. The great majority of children who have chorea, at any rate chorea of any gravity, develop some cardiac affection in its course. This may amount to nothing more than a functional affection, but more commonly there are present in addition organic lesions of the heart structures. The slightest choreic affection of the heart is what is known as "chorea cordis," which is merely an irregularity of the heart's action, such as is very noticeable in many cases. This in itself is a symptom of no particular gravity, for it is simply a choreic movement of the cardiac muscle. It is well known that during sleep the choreic movements of the limbs cease entirely. On the other hand, the heart never sleeps, and during the hours of slumber the irregularity of the heart persists. Again, hæmic murmurs are not at all uncommonly audible over the hearts of choreic children, and it is important to distinguish such a functional murmur from those due to organic lesions. The several rheumatic cardiac lesions are all common in cases of chorea. The most common of all is endocarditis, which manifests itself in its earliest stages by the development of a systolic murmur at the apex which is conducted to the axilla, and is accompanied by accentuation of the pulmonary second sound. When the condition has persisted for a time other murmurs may develop, and especially a murmur which is a common early sign of mitral stenosis, namely the bruit, to which you had an opportunity of listening just now, and which is known as the mid-diastolic mitral murmur. This has the characters of a reduplication of the second sound, but, unlike a true reduplicated second sound, is only audible in the neighbourhood of the apex of the heart. A true reduplicated second sound, due to asynchronous closure of the semi-lunar valves, must be heard at the heart's base as well as at the

apex. The apparent reduplication of the second sound is due to the fact that the second sound is followed by a short murmur heard in the middle of the diastole, and in some instances it has the character of a short blowing murmur. This mid-diastolic bruit is much more frequently heard in children than in adult patients. As Dr. Lees has taught us, myocarditis, of more or less intensity, is present in almost all cases of rheumatism in which the heart becomes involved. The comparatively rare cases in which myocarditis is diagnosed from the occurrence of symptoms of cardiac failure in the course of acute rheumatism are, indeed, merely extreme examples of a much more widespread condition. The earliest clinical indication of myocarditis is acute cardiac dilatation. The pathological side of the question has been carefully worked out by Dr. Poynton, who has demonstrated myocardial change in practically all the hearts of rheumatic children which he has examined. In cases of chorea without any other obvious rheumatic manifestation, such acute dilatation of the heart is not uncommon, as is the case with more obviously rheumatic conditions. It may precede the development of any actual murmur, and is manifested by an increase in cardiac dulness in both directions. The apex beat is displaced beyond the nipple line to the left, and the left border of the cardiac dulness with it; and there is an equally obvious increase in the dulness to the right of the sternum also. In acute cases, either of simple rheumatism or of chorea, especially in children, one may often observe a rapid increase in the area of cardiac dulness, and a corresponding shrinkage as the patient's condition begins to improve; and, as I mentioned just now, such an acute dilatation may precede the development of any definite murmur.

Lastly, the pericardium may be involved, but pericarditis is a much less common event in rheumatism or in chorea than endocarditis or acute dilatation. Thus any of the cardiac structures—endocardium, myocardium, pericardium—may be affected, or all three may be affected together, and yet there may be no obvious joint lesions, a point of much importance in the diagnosis of rheumatism in children. Subcutaneous rheumatic nodules are sometimes met with in cases of chorea apart from any definite joint affection, but almost always in association with cardiac lesions.

It is an interesting fact that chorea and nodules, which are both manifestations of rheumatism, are conditions which are apt to occur at about the same period of life. Both are common in childhood, both become rare when youth is reached, and both are very uncommon after about twenty-one years of age.

This leads me to refer to the much-discussed question, which is now nearly set at rest, of the relationship of chorea to rheumatism. Twenty years ago there were very strong opinions held on both sides of this question. At the present time I think very little doubt remains that chorea is nearly always, if not always, a manifestation of rheumatism. One is not in a position to assert that the group of symptoms called chorea has no other cause than rheumatism, but certainly in the great majority of instances the evidence points to it being an actual rheumatic manifestation. In order to fully appreciate the bearings of this discussion you must remember that rheumatism in childhood is, in its outward form, a very different disease from the rheumatism of adult life. The structures most of all liable to be implicated in the rheumatism of childhood are those of the heart—the pericardial, myocardial, and endocardial—whereas the liability of the joints to suffer is comparatively slight. As age advances, the liability to implication of the heart diminishes, and in later life it is comparatively little likely to be involved. On the other hand, the prominence of arthritis as a symptom increases with advancing years. Some of you may have met with cases of rheumatic fever occurring for the first time in people of sixty or seventy years of age. These cases are often very puzzling. The patients are apt to be extremely ill, and they sometimes exhibit very serious functional disturbance of the heart, and its slow action or its feebleness may give rise to much anxiety, but there is little or no tendency to the development of such organic cardiac lesions. In such cases the joint trouble tends to be very conspicuous, and as it is sometimes confined to a few joints it is liable to be mistaken for gout, a disease which is much more often met with in patients who have reached the period of life in question.

Chorea is one of a group of symptoms which are specially conspicuous in the rheumatism of childhood. The various heart troubles which I have already mentioned, such as subcutaneous

nodules, are very common in rheumatic children, and true rheumatic nodules seldom, if ever, develop in patients much older than twenty. It is true that lesions resembling the true rheumatic nodules are occasionally met with in cases included under the name of “rheumatoid arthritis,” occurring in middle-aged subjects, but these are more permanent and are apt to be very tender, which the rheumatic nodules of children are not. The rheumatic nodules of children are transitory: they come quickly and disappear quickly. Successive crops of nodules develop in the same situation, so that there may be nodules present in a given region for months at a time. The diagnostic and prognostic significance of the true rheumatic nodules is very great. They consist of small collections of inflammatory lymph among the fibrous tissues, and usually occur upon prominent excrescences, such as the knuckles, elbows, knees, the occipital region of the head, or the spinous processes of the vertebræ. Their chief importance lies in the fact that they show that an active rheumatic process is at work, and they are also important because they are especially apt to be associated with a severe type of cardiac lesion. In the case in which the nodules are very large there seems to be a special liability for pericarditis to develop; and certainly the sum of one’s experience teaches that the cases in which the nodules are many and large are cases which, in the long run, do badly, and they are hardly ever met with except in association with gross cardiac lesions. When such nodules are present in a case of chorea there can be no longer any doubt that the chorea is itself a rheumatic manifestation.

Rheumatic erythemata also call for mention. They are seen in connection with rheumatism in adult life, but more commonly in children. The erythemata—which are most apt to occur as rheumatic rashes—are the varieties of erythema polymorphe, such as erythema marginatum and erythema papulatum. These are more frequently associated with definite rheumatic lesions than is erythema nodosum, but the latter is often accompanied, as is well known, by articular pains. In former days, when the relation of chorea to rheumatism was much discussed, the presence or history of articular lesions was regarded as the chief evidence of the rheumatic origin of an attack of chorea, and undue importance was sometimes attached to a history of “growing pains,” which

almost any child will give if the point be inquired into. It is now fully realised that arthritis is only one of the manifestations of rheumatism, and one which is more prominent in adult life than in childhood. Of far greater importance in this connection is the presence or absence of cardiac lesions. And yet those who maintained that chorea was seldom, or not at all commonly, a rheumatic manifestation, although they were willing to accept as evidence of a rheumatic origin comparatively insignificant pains in the joints, were less ready to accept the stronger evidence afforded by the so frequent presence of cardiac lesions.

Various views have been advanced from time to time as to the actual pathology of chorea. One of the most celebrated was that put forward by a very brilliant physician who died only too young—he who first described the condition known as ulcerative endocarditis, namely, Dr. Kirkes. His was the embolic theory. On this theory chorea was ascribed to the lodgment of small emboli in the vessels of the brain. I do not think that anyone now holds the embolic theory of chorea. Since Kirkes wrote our views as to the nature of rheumatism have undergone profound changes, and its infective origin is no longer doubted. Discussion centres round the question whether the disease is due to a specific micro-organism, such as the diplococcus described by Wassermann and Poynton and Paine, or whether it is an attenuated pyæmia due to ordinary pyogenic cocci. Drs. Poynton and Paine have detected the diplococcus which they have described in the brains of choreic patients, just as they have found it in the pericardial fluid, in the cardiac vegetations, in the rheumatic nodules and in the joints. That is undoubtedly a very important observation. Moreover, they have observed movements resembling those of chorea in rabbits which have been inoculated with the organism. If chorea be actually due to bacterial invasion of certain localities or parts of the brain, we have to do with a definite local cerebral lesion such as one would expect to find, in view of the tendency of chorea to assume a hemiplegic character; whereas a toxic theory which regards chorea as not due to an organic lesion in the brain itself, but to the action of the toxic products of bacteria upon the brain, is hardly compatible with the marked tendency to a unilateral character which is so prominent a feature of the condition.

One of the conditions quoted as affording evidence that chorea is not always of rheumatic origin is chorea gravidarum, the chorea which is apt to occur during pregnancy, in quite young women, and which is usually of grave prognostic significance. In the last volume of the 'St. Bartholomew's Hospital Reports,' Sir Dyce Duckworth, who has always been interested in this question of chorea and rheumatism, published a short paper dealing with some cases of chorea gravidarum, in which he brought forward very strong evidence that these cases also were definitely of rheumatic origin. It must be acknowledged that cases of chorea are met with in which there are no cardiac lesions, in which a history of rheumatism or rheumatic manifestations is wanting, and in which there are no concurrent rheumatic manifestations. In some at least of these cases, other definite manifestations of rheumatism develop at a later period, and experience shows that chorea is not unfrequently the first of the series. This fact that chorea may occur alone as an isolated manifestation, the earliest of a series of rheumatic troubles, leads one to think it probable that all cases of chorea are really due to one cause, and that the cause in question is a rheumatic infection. A slight degree of febrile disturbance is a common feature in cases of chorea. You will have noticed in the charts which I showed you in the ward the up-and-down temperature, a kind of febrile disturbance such as is frequently present in cases of endocarditis. In acute rheumatic attacks the temperature runs no very definite and certain course, but fluctuates conspicuously according to the nature of the manifestations present. When the arthritis quiets down the temperature usually falls to nearly normal, although endocarditis may continue to progress. Pericarditis also is a lesion which is apt to be accompanied by a high temperature. On the other hand, there can be little doubt that the temperature which is so often observed in choreic cases is associated with the concurrent endocarditis, at any rate in most instances.

It remains to speak of the treatment of chorea. In mild cases very little treatment is required. Rest in bed is the most important factor. The late Dr. James Andrew used to say that the best cure for chorea is six weeks' rest, and there is a great deal of truth in the dictum. As regards salicylic treatment opinions differ widely. If one holds strongly the view that chorea is a manifestation of rheumatism, it is a very rational course to treat these cases with salicylates. However, experience has shown that salicylate, at any rate in ordinary small doses, has no such controlling power over chorea as it has over arthritis and the tempera-

ture which accompanies it in acute rheumatism. My colleague, Dr. Lees, is convinced that salicylate of soda is a drug of much value in the treatment of chorea, but he gives it in very large and frequently repeated doses, and guards against any evil results which it might produce by giving still larger doses of bicarbonate of sodium with it. There appears to be no doubt that very much larger doses than could otherwise be safely given may be administered with impunity in association with a large quantity of an alkali such as sodium bicarbonate. In some cases I have seen a very rapid improvement follow the administration of large doses of salicylate, but I must confess that I am not yet convinced that in the long run one gets much better results from this treatment than with others or with no drug treatment at all. I have not been able to convince myself that arsenic in small doses has a conspicuous effect in chorea. Probably it has a marked effect if given in large doses, doses which are almost toxic. In the mild cases I think as good results are obtained by simply keeping the patients at rest in bed as by the administration of any drugs. Of course bad cases, such as the one I showed you in the ward, call for some more active drug treatment, and I think that the statement still holds good that the most useful drug in the treatment of bad cases of chorea is chloral. In some recent cases we have given chloralamide instead. In some cases the drug keeps the patient much quieter and enables him to sleep, and, as you know, sleeplessness is one of the great sources of danger in chorea, whilst ceasing to take food is another. Sulphonal is not a drug to be recommended for severe cases of chorea, although it has a quieting effect upon the patients and favours sleep. In mild cases it has appeared to me to be quite without effect. It is a curious fact that in bad cases of chorea, in which drugs are being pushed, a sudden cessation of all treatment is sometimes followed by an immediate and rapid improvement.

A very important point in connection with the treatment of chorea is to have due regard to the endocarditis which so often accompanies it. The main desideratum in the treatment of endocarditis is as complete rest as is possible, in order that the heart may have the best chance of recovery. I think that we are apt to let our rheumatic patients get up too soon, and to let them resume their ordinary life without a proper interval of relative rest and life on the level after the acute stage of the disease is over. If it were the rule to keep these patients in bed for a longer time after the subsidence of the condition for which they first came under treatment, and to limit their activities for months or even a year after the attack in which the heart became involved, there would, I think, be a good chance of considerably reducing the amount of serious organic heart disease in the world.

A CLINICAL LECTURE

ON

PAIN AS A SYMPTOM IN URINARY DISEASE.*

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GENTLEMEN,—Pain in urinary disease will suggest to most of you renal colic as a symptom of renal calculus and "pain at the tip of the penis" as pathognomonic of stone in the bladder. You will, however, have met with cases in which one or other of these pains was present and no stone was found in the kidney or the bladder. And you will, further, have seen cases of urinary disease in which pain was present in parts of the urinary system that you had reason to believe were normal and absent in those parts which you knew were diseased.

You will therefore have come to look upon pain as the least important symptom of urinary disease. If I can do something to restore your confidence in this symptom and assist you to use it in your diagnosis of a urinary case, I shall feel that your time this afternoon has not been misspent.

Each of you has learned in your practice to make an appropriate discount from the pain described by certain of your patients, and you have come to realise that pain, like other sensations, such as sight and hearing, may become specialised in certain individuals. Your experience has led you to place a certain pain-value on each disease, and enables you to receive the exaggerated complaints of a hypochondriac with a calmness born of this knowledge. I need not therefore make any further remarks upon the individual variation of pain except to say that I believe the value of pain is rather more frequently under than over-estimated in practice.

Pain in urinary disease has two very distinct and important uses. It is the chief and sometimes the only localising symptom, and herein lies its greatest value. But it may also be a diagnostic sign of considerable importance.

I shall consider pain to-day under the first of

* Delivered at the Medical Graduates' College and Polyclinic.

these two headings ; but before doing so let me say a word in regard to the types of pain you will meet with.

Renal colic is familiar to all of you. It is the most agonising pain you will have to treat in urinary disease. Fortunately, it is transient and to some extent under the control of drugs. It is the sensation of non-striped muscular spasm, and usually represents the struggle of the ureteral muscle against resistance. To this is added in many cases the contact of a rough spiculated calculus against the mucous membrane of the kidney pelvis or ureter. Strangury or tenesmus represents a similar condition of the bladder, but here the spasm results in most cases from stimulation of the tactile sensation of the mucous membrane and seldom from obstruction.

A sharp pricking sensation is suggestive of the contact of a calculus with the mucous lining of the kidney pelvis or the bladder. It is seldom spontaneous, but is awakened by movement or by bladder contraction. It may sometimes be elicited in renal stone by sharply percussing the front of the abdomen over the kidney (Jordan Lloyd's sign).

Dull, aching, persistent pain represents the sensation of tension either from inflammation, as in nephritis, or from urinary pressure, as in blocking of some part of the urinary passages. It is an important symptom and one you should never neglect.

There are in addition referred pains, mostly of an aching character, of which I shall have more to say later.

Pain as a Localising Symptom.

In order to appreciate the value of pain as a symptom you must be familiar with the distribution of pain in disease of the different parts of the urinary system. I do not mean that you must study the distribution of the cutaneous nerves and trace their connection by visceral branches with the different organs. That would be a scientific exercise for which I know most of you would not have the time. What I wish you to realise is that the pain in disease of the various parts of the urinary system affects certain well-defined areas, and that the presence of pain in these areas has a certain localising value. In mapping out these areas I do not intend to discuss or even mention every other cause of pain which may affect each spot, although I may mention incidentally a point

of importance here and there. As a matter of fact you will seldom have much difficulty in diagnosing, from the presence of other symptoms, that the pain originates in the urinary system. Nor do I wish to give you the impression that pain is necessarily present in urinary disease, for you are aware that quiescent disease, of the kidney especially, is not infrequent. But what I would ask you to do is to seize upon pain when it is present and use it to its full worth as a localising or a diagnostic symptom.

Renal Pain. Posterior Renal Pain.

If you map out the twelfth rib and the outer border of the erector spinal mass of muscle, you will see that they meet at an acute angle. In this angle is the area in which true renal pain is found (Fig. 1).



FIG. 1.—Posterior renal pain.

A patient suffering from kidney disease will often tell you that he has pain in his back. Ask him to put his thumb on it and he tucks his thumb into this angle (Fig. 2). You will note that the area of pain corresponds to the lower pole of the kidney, and not to the body of the organ.

The pain of renal colic often commences in this region, but just as frequently the patient has no pain here during his attack, for renal colic is not truly renal but ureteral in its origin.

You will most frequently find dull aching pain in this region in renal calculus, in tubercular disease of the kidney, and in some forms of nephritis, and the unilateral distribution will give you valuable information in regard to the side effected. Bilateral pain is found here in various forms of nephritis, whether medical or surgical.

There are, however, certain fallacies to which I must draw your attention.

You have heard of transference of pain from one kidney to another, and I shall discuss this later.

You will find renal pain present in a number of diseases of the lower urinary organs, but with care you will avoid the mistake of believing that the kidney is the seat of the principal trouble. In stricture and in enlarged prostate, both obstructive diseases, the patients frequently complain of lumbar pain, and if you inquire carefully you will find that bilateral renal pain is present. The pain is due to back pressure. In these cases it is, however, of a dull, aching character, and the symptoms of the stricture or enlarged prostate are



FIG. 2.—Patient demonstrating posterior renal pain.

obvious, so that you are not likely to be led astray. Do not, however, under-estimate the importance of this pain: it means a dilating kidney and calls for relief of the urinary obstruction.

Sometimes you will find this back-pressure renal pain on one side only; for, as you know, one ureter always gives before back pressure earlier than the other.

I saw a man recently at St. Peter's hospital who had suffered from stricture for some years. For the past few months he had noticed that each time he made water there was pain in his left renal region during the act, and further, when his stricture was worse in cold wet weather or after taking liquor the pain was more marked and was felt at each micturition. This man's left ureteral

sphincter had given way, and he had an increase in the back pressure on his left kidney at each contraction of his bladder. The pain disappeared when his stricture was dilated.

The cases in which you are most likely to be misled by renal pain are those in which a papilloma, or sometimes a malignant growth of the bladder, is situated at the ureteral opening and gives rise to renal pain on that side. When you question such a patient, he usually complains of pain and hæmaturia without any other symptom. If you rely upon the pain for localising the source of the hæmaturia, you will be led astray.

The following case will show you the difficulty in diagnosis.

Jessie S—, æt. 55 years, came under my observation in August, 1904. Three years previously she suddenly noticed blood in her water: there was a slight increase in the frequency of micturition, and she began to have aching pain in her right kidney. She was seen by her doctor, who believed that the hæmorrhage came from the right kidney. She continued to bleed, with varying intervals of clear urine, during three years. On examining the bladder with the cystoscope, I saw three papillomata springing from the trigone, one of which obscured the right ureteral orifice. After removal of the papillomata, the bleeding and the right renal pain disappeared.

Posterior renal pain is the most common in kidney disease, but a patient will sometimes tell you that the pain "goes through to the front," and he will point to an area on the abdominal wall which I shall term

Anterior renal pain area.—If you get an intelligent patient to indicate as accurately as he can the area of this pain, he will point to a spot a little above the level of the umbilicus rather nearer the margin of the ribs than the middle line (Fig. 3). The pain in this area is, perhaps, more closely related to disease of the kidney pelvis than to changes in the renal substance. The two are, however, so closely associated that for practical use you may look upon this as anterior renal pain.

Renal colic frequently commences here. You will note that on the right side the gall-bladder is in close proximity, but you will seldom have difficulty in distinguishing, from the presence of other symptoms, between the two forms of colic.

In this region you will find dull aching or sharp

pricking pain on movement in pelvic calculus, and here you will elicit the pricking sensation on percussion in calculus that is associated with the name of Jordan Lloyd.

This is also a very frequent seat of pain in movable kidney, due no doubt to dragging on the renal pedicle. Pain and tenderness over this area is found in pyelitis. In the following case of ascending pyelitis after parturition the pain was so severe as to lead to a suspicion of calculus.

I was asked to see Mrs. C—, a primipara, æt. 33 years, on account of severe pain in the right kidney. Dr. Parkinson, who was in charge of the case, gave me the following history.

A difficult instrumental labour three weeks previously had been followed by some frequency



Fig. 3.—Anterior renal pain (case of movable kidney).

of micturition and straining. On the fourth day some pus was noticed in the urine and she began to suffer from pain in both kidneys. The pain on the left side soon subsided, but that on the right side became more severe.

When I saw her there was almost constant dull pain over the right anterior renal area, and to a less extent at the posterior renal area. At times the pain became severe and almost amounted to colic. It radiated downwards from the anterior renal area to the right groin. There was marked tenderness over the right kidney in front and to a less extent in the loin. The urine was acid and contained pus. Bilateral ascending pyelitis was present and was most marked on the right side. After a few weeks the pain subsided and the urine cleared.

Ureteral Pain.

You are all familiar with the phenomenon of renal colic, the most excruciating agony you will meet with in urinary disease. If you ask the patient to trace the course of the pain after the attack has subsided, he will commence either at the posterior renal area or on the front of the abdomen at the anterior renal area, and draw his finger along a line passing downwards and inwards to the external abdominal ring, and sometimes along the spermatic cord to the testicle. After the attack is over or in the quiescent period between several attacks, there is frequently a dull aching pain along this line. Fig. 4 shows pain areas along this line in a case of descending ureteral calculus. The lowest pain area in this figure represents pain at the root of the penis, and is unconnected with the ureter. The next above this is external abdominal ring pain and represents the lowest part of the ureter.

The line indicates roughly on the abdominal wall the course of the ureter, and if you press deeply along this line soon after an attack, you will elicit tenderness. The lower part of the line is often nearer Poupart's ligament than I have indicated and might be called groin pain. You will realise, therefore, that renal colic is more properly ureteral colic, and is due in its severest form to spasmodic contraction of the ureteral muscle.

Renal colic indicates, as you know, the passage, or attempted passage, of a foreign body along the ureter. You will meet with it in all degrees of severity and duration, according to the extent and suddenness of the blockage and the character of the foreign body. Many small stones pass from the kidney pelvis into the bladder without causing sufficient pain to attract the attention of the patient. Others become arrested at some part of the ureter, usually the lower part, and cause so little irritation and obstruction that the first indication of their presence is given when they increase in size and produce a swelling in the loin from dilatation of the kidney. In other cases small stones are repeatedly passed down the ureter, causing a moderate attack of renal colic, and then are passed from the bladder. There is another class of cases that is more important in connection with pain as a localising symptom, and to which I wish to draw your attention. A stone may be small enough to enter the ureter, but have difficulty in pass-

ing the narrow points of this tube. These narrow points are to be found, as you know, just below the kidney pelvis, at the brim of the true pelvis, and at the entrance of the ureter into the bladder wall. In addition to the difficulty in passing these points a descending calculus may be of such a shape or have so irregular a surface that it is forced on only a little way at each effort of the ureter, or it becomes fixed until some movement of the patient shifts it into a more convenient position for moving on. Thus you may have a calculus travelling slowly down the ureter with successive pauses of varying duration at different points of its descent.

The pain in these cases varies in character. There may be merely dull persistent aching, but more frequently there are recurrent attacks of moderate renal colic followed by fixed pain over the part at which the calculus is arrested.



FIG. 4.—Pain in descending ureteral calculus.

In Fig. 4 you will see the successive pain areas during four years in a case of descending ureteral calculus.

Let me relate a case to show you that it is possible to locate the position of a ureteral calculus with sufficient accuracy to cut directly upon and remove it.

H. D. M—, a man æt. 33 years. In August, 1901, he had a severe attack of pain in his posterior renal region in the right side, passing through to the anterior renal area and shooting “down to the bladder.” For some weeks before this he had felt slight pain in the right posterior renal region, which was worse during the day. Three weeks after this attack blood appeared in his urine, during one micturition, and again twelve months later he passed blood twice. From October, 1901, until

January, 1903, he had persistent discomfort along the line of his right ureter. In June, 1904, he had three attacks of colic commencing in the right kidney and passing down “to the bladder” accom-



FIG. 5.—Pain in stationary urethral calculus. Note scar of operation below this.

panied by slight hæmaturia; and following these attacks there was heavy fixed pain just above the middle of Poupart's ligament. In April, 1903, an X-ray photograph was taken, but no stone found. In the same month cystoscopy showed a dilated right ureteral orifice, but this dilation later disappeared and no difference could be made out between the two ureteral openings. The right kidney did not appear to be working so energetically as its neighbour. In January, 1904, I was able to feel high up on the right side of the rectum a small, hard, pea-sized body lying at the side of the pelvis. This was felt on several occasions and on pressure over the nodule the patient exclaimed “That is it!” and stated that this caused pain at a spot a little above and internal to the middle of



FIG. 6.—Calculus removed from ureter (see Fig. 5).

Poupart's ligament similar to the fixed pain which succeeded his attacks of colic. There was never any increased frequency of micturition. In July, 1904, I exposed the right ureter extra-peritoneally by an

incision parallel to and just above the outer two-thirds of Poupart's ligament (Fig. 5). The calculus, an irregular oxalate (Fig. 6), was found lying in the ureter just below the brim of the pelvis, and was removed by incising the ureter longitudinally. The ureteral wound was closed by Lembert sutures and the abdominal muscles united in layers. A small drain was retained for the first twenty-four hours and then removed as no leakage occurred from the ureter. The wound healed without incident. You will realise how valuable pain was as a localising symptom in this case.

At one spot the right ureteral pain line lies very near McBurney's point. This part of the ureteral pain line corresponds to the ureter at the brim of the pelvis, and you know that at this point a calculus is frequently arrested. McBurney's point, the point of maximum pain in appendicitis, is probably the most widely known pain area at the present day, and it is therefore not surprising that the two conditions, relapsing appendicitis and ureteral stone at the pelvic brim, are sometimes confused. Nor is it surprising that the common disease, appendicitis, is the one diagnosed and the rarer condition, ureteral stone, constantly overlooked.

In May, 1903, I examined a woman (E. H.—, æt. 28 years) who complained of right-sided attacks of abdominal pain. She bore the scar of an appendix operation and related the following history. Since the age of thirteen she had frequently passed small pieces of grit at intervals of one or two years. She had suffered, from time to time, from attacks of severe pain in the right side of the abdomen. Hæmaturia had not been noticed. The attacks of pain became more and more severe, and she was admitted to one of the large London hospitals, where an operation for appendicitis was performed by a well-known surgeon. The appendix was removed but "no abscess was present." During convalescence from the operation she passed a small stone after an attack of her old pain, and five weeks after leaving the hospital she passed a larger stone after severe right-sided abdominal pain. On cystoscopy the bladder mucous membrane was healthy. The trigone was somewhat congested and the right ureteral opening was puffy and prominent, with reddened everted edges. There is no doubt that the appendix operation was performed on account of the ureteral pain. This case will show

you how closely the symptoms of appendicitis may be simulated by ureteral stone, and will put you on your guard in dealing with such cases.

Ureteral pain is, of course, not confined to stone. Apart from the renal colic of the passage of blood-clot and tubercular material, you will find dull pain along the line of the ureter after the passage of gravel.

In one case I was asked to examine a patient fourteen days after a negative exploration of the right kidney by a colleague. There had been a sudden rise of temperature and pain along the line of the ureter. There was marked tenderness along this line and as far as the brim of the pelvis. I could feel a cord passing down as far as the brim of the pelvis by deep palpation through his lax abdominal wall. There was marked tenderness high up in the rectum on this side and the lower end of the right ureter was thickened. Pus appeared in the urine, but there was no hæmaturia. The symptoms cleared up in a few days. This patient had suffered from an attack of acute descending ureteritis.

You will find pain at the lower end of the ureteral pain line—that is, at the external abdominal ring—in many cases of urinary obstruction. Sometimes this pain is due to inguinal hernia from the straining during micturition; but you are often able to exclude hernia, and you know from the position of pain in ureteral calculus and from the pain at these spots when you over-distend the bladder with fluid that this pain corresponds to the lower end of the ureter, and in urinary obstruction it means commencing dilatation of the lower end of the tube. The pain is usually bilateral, but sometimes it is unilateral. As a point in diagnosis it tells you that the ureteral sphincter is commencing to give before the back pressure. As a rule the symptoms of stricture or enlarged prostate are sufficiently evident to render this pain superfluous in diagnosis of the presence of urinary obstruction; but in one case, a young man with stricture, the chief complaint was pain at the external abdominal ring on each side, and the other symptoms of stricture had not attracted his attention. In this case I was able, from the position of the pain, after excluding hernia, to infer and afterwards to demonstrate with the urethroscope the presence of a stricture of the bulbous urethra.

In some cases of ascending or descending tuber-

cular disease of the ureter the patient will tell you of a persistent pain, or as one of my patients expressed it, "the feeling of an open sore," at some point along the ureteral line. This is no doubt produced by the urine passing over a tubercular ulcer. It seems to be more frequent at the region of the pelvic brim.

Bladder Pain.

When you come to study bladder pain you will find that the analysis is rendered more difficult by the relation of the pain to micturition. The complicated act of micturition involves not only the bladder itself, but the whole of the lower urinary apparatus, and especially the prostatic urethra. You will therefore find it difficult to distinguish what part of the pain owes its origin to the bladder itself and what part arises from the prostatic urethra. You will, I think, best study the subject by considering separately bladder pain which occurs apart from micturition, and then taking up pain which occurs in relation to micturition under the special heading of vesico-urethral pain. This division, if it is not very precise, is at least practical. Let us therefore consider firstly bladder pain arising apart from micturition.

The non-inflamed bladder is comparatively insensitive to touch. You may pass a sound and search its surface with the beak of the instrument without causing, so far as the bladder is concerned, any complaint of pain from the patient. The sensitiveness of the bladder to touch is about that of the rectum in a normal individual, and it appears to be less sensitive than the anterior urethra and of course much less sensitive than the posterior urethra. The viscus is, however, very sensitive to tension. This we expect from our knowledge that the act of micturition is initiated in response to the increase in bladder tension. When the bladder is over-distended with urine a heavy aching pain is felt above the pubes. Severe pain may also be felt here when the bladder contracts against obstruction and in spasmodic contraction of an inflamed bladder. The pain is here part of the more extensive vesico-urethral pain. A heavy dull ache is also felt in the perineum, but perineal pain is so intimately associated with the prostate that this probably results from the pressure upon that organ.

Vesico-Urethral Pain.

The part of the urethra here involved is the pros-

tatic portion, which, as you know, is the most sensitive part of the urinary tract.

The pains we will consider under this heading are usually related to micturition, but you will also find them remaining after the act and less frequently occurring apart from micturition. These pains are usually associated with an increase in the frequency of micturition, and represent in most cases inflammation of the mucous membrane or the contact of a foreign body, such as a stone. Spasm of the bladder muscle may be superadded and increase the violence and radiation of the pain. The patients are often unable to indicate any surface spot or area of pain. They have a better knowledge of the position of the bladder than of their other organs, and reply to your questions that the pain is deeply seated in the bladder itself. They sometimes feel a deep-seated pricking pain "in the bladder" when a vesical calculus is present. Frequently in inflammation of the bladder base from stone, tubercle, or other disease the patient points to a spot at the root of the penis, on one or other side or around the base of the organ and states that the pain is felt deep in at this level (Fig. 4, lowest pain area). This represents the angle of the pubic arch, and is about the level of the upper part of the prostatic urethra and the vesico-urethral opening. This is the most direct vesico-urethral pain; the others are referred to a distance.

You will find perineal pain associated with vesico-urethral disease, but almost invariably in connection with micturition. It is intimately associated with prostatic disease, and I shall refer to it again in that relation. It may sometimes be an earlier symptom of stone in the bladder than the better recognised pain at the end of the penis. An observant patient who had twice had a vesical stone crushed came to me for cystoscopy, having once more begun to suffer from perineal pain which his previous experience taught him preceded the more severe pain at the end of the penis. There was a deposit of uratic sand behind the interurethral bar but no stone.

Pain at the end of the penis is a symptom that you associate with stone in the bladder. It is a very common symptom and you will expect me to consider it fully. The pain often shoots along the urethra and it is only more marked at the end of the penis. You must disassociate this from the painful burning and scalding that accompanies and

succeeds the passage of highly irritating urine. If you question patients closely in regard to the position of the pain at the end of the penis, you will find that it may be present in any one of three positions. Some patients point to a spot on the dorsum of the penis at the base of the glans, some to the meatal opening, and others again to a spot on the under side of the penis at the base of the frenum directly opposite that on the dorsum.

The dorsal pain is the least significant, although not the least frequent. I have only rarely found it connected with organic disease. Most of these patients are neurotic, and this is one of their pain spots. Do not, however, neglect the pain merely from its position. Meatal pain is the rarest of the three. This pain and the pain on the under surface are usually significant of vesico-urethral disease. Sometimes you will find these pains caused by a local patch of chronic urethritis, but here they are less severe, and the accompanying symptoms readily distinguish such cases. The pain on the under surface of the penis is the most frequent and important of the three pains at the "end of the penis."

Pain "at the end of the penis" is not so exclusively associated with stone in the bladder as your reading would lead you to suppose. If you analyse this pain, you will find that it represents irritation at the bladder base or in the prostatic urethra. It has also been described in disease affecting the ureter or kidney pelvis (Fenwick), but for practical use you may look upon this as a vesico-urethral pain.

You will find this pain very frequently but not invariably in vesical calculus, but you will also find it in tubercular disease of the bladder base, in bilharzia cystitis, and even in simple cystitis. You will also meet with it in such cases as stone lodged in the prostatic urethra or a pedunculated papilloma of the bladder, the pedicle of which is sufficiently long to allow it to engage in the bladder neck during micturition. The following case will illustrate the latter type of pain.

T. N—, æt. 28 years, came to my out-patients department at St. Peter's Hospital in July, 1904. Six months previously he suddenly passed blood and continued to do so until he applied for relief at the hospital. At the same time as the blood appeared he began to have greatly increased frequency in micturition and passed bloody urine

every five minutes day and night, straining at each act. Cutting pain shot along the urethra to a point at the base of the frenum, where it was intense during and after each act of micturition. When I saw him he was in constant pain and was unable to sit still for an instant. I diagnosed a pedicled growth of the bladder engaging in the urethral opening. Seven days later the bleeding suddenly stopped and I was able to confirm my diagnosis by cystoscopy. I afterwards removed the growth, a papilloma attached by a long stalk to the neighbourhood of the right ureter.

Where spasm of the bladder is superadded you will find that the pain radiates further afield.



FIG. 7.—Pain at sacral base and sacro-iliac synchondroses in prostatic disease.

Most frequently it spreads down the inner side of the thighs and it is said to spread as far as the heel.

These remarks apply to the male bladder. You will seldom be able to get a female patient to localise vesical pain with accuracy. Suprapubic, urethral, and meatal pain appear to represent the areas of vesical pain in the female.

Prostatic Pain.

In studying prostatic pain you will have to separate carefully the vesico-urethral pains which result from accompanying disease of these structures. Having done so, you will find that the most characteristic pain areas of prostatic disease are at "the lower part of the back," the perineum, and in the rectum. In any form of prostatic disease, whether it is acute or chronic prostatitis

or senile enlargement or malignant growth of the prostate, the patient may tell you that he has dull aching pain at the lower part of the back (Fig. 7). A broad band across the base of the sacrum covers this area. Sometimes the pain is most marked or even confined to the region of one or other sacro-iliac synchondrosis. If you hear a patient complain of this pain, examine the prostate at once and you will seldom be disappointed in finding some change in the organ.

Perineal pain is also very common in prostatic disease. In chronic disease it is a dull ache, but in acute prostatitis it is a severe heavy pain. I have already mentioned perineal pain in connection with vesico-urethral disease. In these cases it is more intimately connected with the act of micturition, in prostatic disease it is more likely to be persistent.

Pain in the rectum is severe and throbbing in character in acute prostatitis; in chronic prostatic disease it usually amounts to a dull aching, a feeling of fulness, or merely to discomfort. These pains are increased or initiated by defæcation. You should examine the prostate carefully in patients who suffer from "piles." The rectal discomfort of prostatic disease has led to mistakes in this relation.

Pain along the urethra and at the end of the penis may be complained of in prostatic disease. Most patients with enlarged prostate complain of pain along the urethra, but on analysing it you will find it is due to scalding of the acrid urine. Pain at the end of the penis in prostatic disease means, I believe, involvement of the prostatic urethra or bladder-base.

Referred Pain in Urinary Disease.

There seems no very evident explanation as to why the urinary organs should provide so rich a field for referred pain. I have already alluded to the radiation of pain in renal colic along the spermatic cord to the testicle, and of pain in strangury along the inner side of the thigh, but referred pain is not necessarily severe and need not accompany pain in the organ from which it receives its stimulus.

You are familiar with the heel pain in renal calculus. Pain may also be present in the thigh and knee and in the leg. These referred pains in kidney disease occur much less frequently than you would gather from your reading. They are, I

believe, somewhat rare and are more interesting as possible sources of error than valuable as diagnostic signs.

Referred pain from a diseased kidney to its sound neighbour, without the former giving any pain indicative of its condition, would completely destroy the value of renal pain as a localising symptom. Guyon and later Thornton were, however, convinced that this transference of pain did occur and the possibility of this referred pain has become widely known, if not accepted. You must remember, however, that Thornton's evidence was based upon the examination of the kidneys by palpation from within the abdomen, and if you have had any experience in post-mortem work you will recognise how frequently the kidney may be extensively diseased without giving any evidence on palpation before its removal.

I have never met with a case in which there was any suspicion of such transferred pain, and you will find that the best authorities at the present time place no reliance on the possibility of its occurrence. It is a different matter when pain is present in a diseased kidney and radiates to its neighbour. This you may accept as receiving the support of most surgeons experienced in renal work. A case I related to you last week in which a kidney, afterwards proved healthy by microscopic examination, was the seat of pain and was removed, while its diseased neighbour, which was bleeding and painful, was left, was apparently a case of referred pain.

Testicular neuralgia, apart from renal colic, has been described in renal calculus.

The prostate is even richer in referred pains than the kidney. You will meet with some very puzzling cases in which soon after, or some years after, a gonorrhoeal urethritis a patient complains of pains in different parts of his body. You should not confuse these cases with the peripheral neuritis for which gonorrhoea is sometimes responsible, nor should you look upon them as cases of gonorrhoeal rheumatism; for the pains are unaccompanied by any other signs of neuritis, and where they are referred to a joint no objective changes occur in or around the joint.

You will find in some of these cases that there are obvious signs of chronic prostatic inflammation such as threads in the urine, irritation in the prostatic urethra and tenderness of the prostate itself. The prostate is seldom increased in size, but you will not infrequently find thickening of the gland substance at the upper and outer margins as felt from the rectum. These thickenings are tender to the touch. The seminal vesicles may also be the seat of chronic inflammation.

The referred pains affect many parts of the body and have a tendency to shift about from one part to another; a frequent seat of pain is the back of the thigh, and sciatica may be simulated. Joints

are not infrequently the seat of these aching pains, but there is no swelling or thickening around the joint and no interference with its movements. The muscles of the calves, of the back of the neck, and of the back of the arms may be the seat of pain, but again there is no interference with nutrition or function. The pains are usually worse in cold, damp weather. They may last for many years.

You must separate these cases from the well-known forms of urethral neurosis in which there are disturbances of the genital functions. I shall quote one case as a type.

J. R—, æt. 28 years, a strong, healthy-looking man, had an attack of gonorrhoeal urethritis five and a half years ago. The discharge was copious, and was followed for twelve months by a gleet.

Seven days after the commencement of the discharge he began to have pains in the popliteal space on each side and in the calves. His arms then became affected, and pain was especially severe in his elbows. There was also pain at the back of his neck, across the sacral base, and in both groins. At this time he apparently passed through an attack of acute prostatitis, as he was confined to bed for three weeks with frequent and painful micturition, slight hæmaturia, and throbbing perineal pain. The pains subsided to some degree, but the leg pains were the most persistent. The other pains used to vary. When I examined him he had a slight gleet and his prostate was tender and firm but not enlarged. The seminal vesicles were thick, hard, and tender. His pains varied a good deal and improved somewhat under treatment. At times, and especially in wet weather, all the situations above described were the seat of pain, but the most severe and persistent were those in the back of the neck, the knees, and the calves, and he had continual sacral base and perineal aching. There was no tenderness of any of the affected muscles, no wasting, no thickening or swelling of any of the joints, and no change in the surface of deep reflexes. At one time his pains almost entirely disappeared for a week, but they returned again and still persist in his calves, perineum, and sacral base.

In some cases of persistent referred pain in prostatic inflammation the pains are situated entirely below the level of the seat of the disease. Thus you may find the patient complaining of pain or numbness in the legs. In such cases involvement of branches of the nerve plexuses, by extension of the chronic inflammation to the pelvic areolar tissue, seems a probable explanation; for you know that chronic pelvic cellulitis, although less common than in the female, may occur in male subjects from the spread of prostatic or seminal vesical inflammation.

These cases do not, however, come under the same category as the referred pains I have described above.

SOME HEALTH RESORTS IN FRANCE.

No. III.

Saint-Nectaire.—The party of medical visitors rose early on September 6th, and by six o'clock had started from Mont-Dore on a long drive over the mountains to Saint-Nectaire, which lies nearly 3000 feet above the sea-level, arriving there about half-past ten. Saint-Nectaire has three establishments for treatment with mixed alkaline ferruginous bicarbonate waters, which are recommended for gastralgia, rheumatism, leucorrhœa, and liver complaints. One intermittent spring, rich in carbonic acid, is used as a vaginal douche to secure the effect of an alternating gas and mineral-water douche. The doctors at Saint-Nectaire mentioned also that cases of albuminuria derive great benefit from treatment at this resort. On their return drive to Mont-Dore the party experienced the discomforts of travelling through a boisterous storm of rain, which was a practical demonstration of the fact that the season at Saint-Nectaire, which begins about June, ends early in September.

La Bourboule.—This sunny and invigorating bathing-place was reached before eight in the morning of September 7th, and the party which assembled in the vestibule of the new gallery lately added to the bathing establishment was divided into five groups and conducted round the baths. After this inspection Professor Landouzy delivered an instructive discourse in the Hall of the Casino. In the afternoon an excursion over the Charlannes Plateau, reaching an altitude of 4000 feet, was much enjoyed. A banquet at the Hôtel de Paris, followed by a theatrical performance at the Casino, terminated the visit. La Bourboule lies in an open valley, and is celebrated for its muriated alkaline arsenical water, coming from the richest hot arsenical springs in Europe. No expense has been spared in the provision of sprays, douches, apparatus for inhalations, and of every form of bath, to insure success in the treatment of the patients who throng this bright health resort. The special indications for the use of this water are affections of the respiratory organs, anæmia, gouty and rheumatic troubles, and skin complaints, especially those of a chronic character. The season lasts from May to September, and hotel accommodation will be found to be ample.

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* Specially reported for the Clinical Journal. Revised
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AN ADDRESS

ON

HÆMORRHOIDS.*

By SIR VICTOR HORSLEY, F.R.S., F.R.C.S.,
Surgeon to University College Hospital, and to the
National Hospital for the Paralysed and
Epileptic, Queen Square, W.C.

MR. CHAIRMAN AND GENTLEMEN,—The only safe plan of progress in surgery is to base all operative procedures on definite principles. Though this has now been achieved for many common conditions, it is not a little surprising that in the treatment of such an extremely common condition as hæmorrhoids or piles the first principles of surgery, ancient or modern, are at the present day frequently violated.

This is the more extraordinary as it is now twenty-two years since Mr. Whitehead published † his original views on this subject and demonstrated the scientific accuracy of his methods.

The surgical principles according to which Mr. Whitehead designed his method of excision were:

1. The complete closure of a wound which could be made aseptically.
2. The complete removal of the varicose vein and collaterals, with firm healing of the mucous membrane to the wall of the bowel, etc., so as to render relapse impossible.
3. The saving of pain and discomfort to the patient.

Having for many years practised Mr. Whitehead's operation and knowing its great value, I wish to strenuously oppose the continued performance of ligature and cautery, and to urge that in the interests of the numerous sufferers from hæmorrhoids aseptic excision should invariably be employed.

In the history of surgery it is interesting to note that in 1579 Ambrose Paré did not propose operat-

* Delivered before the Ealing Division of the British Medical Association.

† 'British Medical Journal,' 1882.

ing on hæmorrhoids, but only recommended external applications. In fact, he regarded any treatment to arrest the hæmorrhage of bleeding piles as wrong, for he says: "If the hæmorrhoids bleed in a moderate quantity, if the patients brook it well they ought not to be stayed for that they free the patient from the fear of eminent evil as melancholy, leprosy, strangury and the like." Is this not true now of the old ligature method? Is not that "eminent evil" strangury one of its consequences?

The discussion of operative treatment of piles is very strikingly given by Heister in 1757, who says: "When the Ancients found astringent medicines insufficient for their purpose they cauterised the bleeding veins with a hot iron in the manner described by Scultetus. Others tied up the mouths of the bleeding vessels by passing round them a crooked needle and thread. But the Moderns judging the method of the Ancients too cruel or severe and often pernicious generally leave the case to Nature," etc. However, he seems to have used a form of ligature and excision combined.

From such a position we come to the present day. At the present time there are three operative procedures in common use: the ligature, the cautery, and Mr. Whitehead's excision method; the following description of the first two are taken from Keen and White's 'Text-Book of Surgery.'

Ligature.—The pile being drawn down, the mucous membrane is divided round its base, transfixion being additionally employed if there is a likelihood of the ligature slipping off when the pile has been cut away in front of the ligature. An elongated or what has been called (Ball) a columnar pile is simply tied in two halves.

Clamp and Cautery.—In this operation the pile is simply drawn down and its base fixed with a clamp. The pile is then cut off flush with the clamp by means of the cautery.

Whether we claim to be Ancients or Moderns, the study of cases treated by these operations shows that the procedure is often cruelly painful and frequently "pernicious." In fact, the description of both these procedures reads like an operation practised among savages. There is no method nor surgical principle in either of them, but simply an endeavour to treat a bleeding vessel in the crude way in which Ambrose Paré, and his predecessors, stopped hæmorrhage in their amputations. Not

only is there no principle of treatment in the proper sense of the word, but actually what is done by the ligature and clamp is only a localised destruction of one part of the varicose vessel, leaving the rest of the trunk and its collaterals to dilate again and cause a recurrence and relapse of the condition. Further, by making an open wound in the cavity of the bowel there is thereby produced a septic ulcer, as a secondary consequence of which proctitis often occurs, with more or less intense distress to the patient, and in any case the healing is only by the granulation of an ulcer. Finally, as the tissues of the bowel are dragged together by the ligature in a mass numerous nerve-branches are involved with consequent pain and often reflex retention of urine. It is true that very occasionally there is little or no pain, but in the large majority of cases there is much discomfort, and in many cases severe pain directly after the operation, and later, when the bowel is subsequently allowed to act, the pain is often excruciating.

These procedures of ligature and cautery have always appeared to my mind as unscientific in principle as they are barbarous in execution. I am quite willing to admit that as operative procedures they are easy to perform, but that is the last criterion which should be applied to any surgical procedure. The first criterion should be the suitability of the method of operating to cure the disease, and the second should be the avoidance of risk and pain to the patient.

The question of immediate interest to us is the pathological determination as to what constitutes a pile, and secondly, What is the best method of completely preventing any future development of the evil as well as removing what actually exists? The pathological condition is simply that of a varicose vein, and no one would propose nowadays to treat varicose veins in any other part of the body by gathering up a bunch in a ligature or by burning them with a cautery. Those of us who have seen the systematic development of the proper excision of varicose veins, originally devised by Mr. John Marshall, know that in the evolution of this now every-day procedure it has been found that an essential step in the operation is to provide for the destruction of collateral branches as well as of the parent trunk. This all-important point, to which Mr. Whitehead drew attention in his very

first publication, is not met in the slightest degree by the older procedures I have quoted.

In speaking of the collaterals of the rectal veins I will draw your attention to the fact that there are three great sources of collateral anastomosis of the hæmorrhoidal vessels. The first of these is just



FIG. 1.—Venous supply. (From Savage 'On the Female Pelvic Organs,' 1870.)

under the skin, between that and the external sphincter. These veins communicate with another circular plexus under the external sphincter, and this again anastomoses in the mucous membrane with the branches of the inferior hæmorrhoidal vessels (Figs. 1 and 2).

To overcome such a triple supply as this it is clearly necessary that any operation should provide that all the branches of the veins which are obviously dilated in the bowels should be stopped.

This can only be done by designing the operative procedure so that it should include the removal of all such collateral sources of trouble. To accomplish this it is necessary that all the connective tissue should be removed from and between the external and internal sphincters on the one hand and mucous membrane of the bowel, while the small branches of the inferior hæmorrhoidal vessels, forming the anastomosing plexus of the sub-mucosa, preserve the nutrition of the rectal mucosa.

To Mr. Walter Whitehead, as I have said, belongs the merit of having first seen the necessity of

operating in this manner and of first devising the means whereby it could be achieved. As it is impossible to express more clearly than he has done the sound principles which should guide us in this matter, I will quote from his first publication in 1882 :

"In the healthy rectum the mucous membrane is loosely connected with the adjacent muscle and readily detached ; but in this operation it is one of the objects, and a main feature in the cure, to obtain adhesion between the mucous membrane and the muscular coat of the bowel in order to counteract for the future the tendency to hæmorrhoidal stasis by giving a substantial support to the vessels ; and this is gained by uniting the healthy mucous membrane from above to the verge of the anus—an advantage which cannot be over-estimated. It closes what would otherwise be an open wound in one of the most undesirable localities of the body, and by protecting the raw surface from the irritating influences of passing fæces, prevents a considerable amount of after-suffering, and admits of the only possible chance of immediate repair." *

An objection has been raised to Mr. Whitehead's operation that contraction of the anal orifice is liable to follow the cicatrisation which he has so clearly shown ought to be attained by any opera-



FIG. 2.—Venous supply. (From Savage 'On the Female Pelvic Organs,' 1870.)

tion alleged to be a radical cure. Mr. Whitehead himself pointed out that if suppuration to any extended degree resulted from the infection of the wound, it is conceivable that the cicatrisation of such a process would be attended with considerable

* Whitehead : 'Treatment of Hæmorrhoids,' 1882.

contraction. But if the operation is properly performed and with adequate antiseptic precautions no such suppuration should occur. Personally I believe that those who have observed contraction have in all probability injured the external sphincter muscle. It is, of course, quite easy in performing the operation in a bad case to seriously injure this muscle, and by destroying the mobility of the opening lead to partial closure and contraction during the healing.

It will, perhaps, not be out of place if I now simply recount the steps which I have followed for a number of years, and which are based on Mr. Whitehead's principles. The patient being



FIG. 3.—Circular strip of mucous membrane round piles with margin of skin.

fixed with a Clover's crutch, a circular incision (to save a mess I do a quadrant at a time) is made exactly along the edge of the mucous membrane just where it joins the skin. If there is much prolapse associated with the hæmorrhoids, then an incision should be made horizontally round the mucous membrane higher up the bowel and at a distance from the muco-cutaneous junction, varied according to the necessities of the case. In this way the coincident prolapse can be cured. If the hæmorrhoids have been external for some time and there is a notable amount of adhesion of the skin to the surface of the hæmorrhoid, then a parallel

incision must be carried completely round the bowel higher up and a circular strip of the mucous membrane of two or three centimetres' width removed (Fig. 3). Occasionally the skin is so adherent that it is difficult to secure a cleanly defined edge; but under any circumstances the external skin is not to be removed, but while it is reflected outwards any redundancy of the flaps to be sutured must be met by removing a greater width of the mucous membrane.

It is sometimes very difficult to determine the junction between the mucous membrane and the outer skin; but what used to be described as a metamorphosis of the superficial epithelium is really only a thickening of the sub-mucous tissue, and the distinction can be made by the touch.

The mucous membrane having been reflected inwards, it can very easily be detached from the vessels and nerves underneath it. It is clear, then, that on the outer side of the wound we have the whole mass of hæmorrhoidal connective tissue and vessels concealing the external sphincter and the internal sphincter. It now becomes necessary to dissect the large free end of the pile and to clear its outer surface from the external sphincter. It is this step which may lead to injury of the muscle, and the best way to avoid this accident is to begin at the most anterior point and to expose the fibres of the muscles where they spread out and join the fibres of the other perineal muscles. Further, note may be made here that the colour of the sphincter is often quite pale, and it might even be mistaken at times for connective tissue. A broad spatula being now slipped up between the mucous membrane and the submucous tissue, another is passed on the inside of the external sphincter between that muscle and the substance of the pile. It only remains, therefore, now for the operator to dissect and separate the vessels and connective-tissue "pedicle" of the pile far back. This being done, the vessels of the pedicle and pile are cut through, all bleeding points being stopped by either torsion or by a fine ligature if necessary. In this way the internal sphincter and the vessels and nerves of the external sphincter escape injury. In fact, there is no reason why the vessels and structures of the ischio-rectal fossa should be encroached upon at all. By excising the varicose vessels and tissue of the sub-mucosa while drawing the sphincters outwards, not only the pile but all the collateral vessels to

which allusion has already been made may be removed. This excision being carried all the way round the circumference of the bowel, it is clear that all we have left is normal mucous membrane on the one side and the normal muscular wall of the bowel on the other. If, therefore, the cavity



FIG. 4.—Margin of anus with piles shown in section in Fig. 5. (Museum, University College, London.)

which results is washed out with sublimate lotion, it follows that if the edges of the mucous membrane and the skin be carefully sewn together with fine horse-hair or other material, the net result is an absolute restoration of the end of the bowel to a normal condition. The only thing that can mar the appearance of the wound when thus closed is a certain degree of local œdema of the mucous membrane, which quickly disappears. When the suturing is complete the elasticity of the gases in the bowel is sufficient to maintain the coaptation of the walls of the wound and thus accelerate rapid union. It is not necessary to distend the rectum with a gauze drain or anything of that kind, as is occasionally recommended and, in fact, such packing is only a source of discomfort (Figs. 4 and 5).

I wish now to add a few remarks on the preparation and after-treatment of rectal cases, as I am convinced a certain amount of unnecessary suffering is caused by following the routine of custom, which is often sanctified by text-book authority.

As regards preparation of a patient, if it is possible to arrange it, the bowel should be washed out by a boracic enemata night and morning for the week preceding the operation and each night after the enema has been evacuated a 5-grain iodoform suppository should be introduced. Any necessary purgation should be completed two days before the operation, and as the diet of the last forty-eight hours is of course restricted in the usual way, the enemata secure that there are no residual fæces in the colon.

For the operation the usual preparation of the skin for a perineal case is made, viz. shaving, hot boracic hip bath for half an hour, and double cyanide (zinc and mercury) gauze wrung out of 1 in 1000 sublimate lotion applied.

If any irritation of the skin occurs for the gauze is substituted boric lint soaked in 1 in 40 carbolic acid solution.

After the operation a morphia and iodoform suppository is inserted.

The line of suture is dressed daily with warm



FIG. 5.—Vertical section of anal margin (piles injected with carmine, Museum University College, London) showing relation of submucous tissue to muscular wall of rectum, internal and external sphincter and levator ani.

compresses of double cyanide gauze wrung out of hot mercury or carbolic lotion.

The most important point in the after-treatment

is adequate provision to protect the line of suture against the passage of the *faeces*, and at the same time to save the patient from the intolerable pain caused by the old-fashioned plan of "locking up the bowels" as it is called by administration of opiates. Such treatment, of course, results in the formation of hard and large lumps of *faeces* which cause great pain in their passage, and the opiates upset the digestion and cause additional misery to the patient. The whole of this established routine is false in principle and practice.

Instead of it I advise the following: On the third day (or fourth if there is no abdominal distension or discomfort) three or four drachms of a sterilised soft bismuth ointment is gently injected into the bowel by a rectal ointment repositor and the ointment applied also to the anus. Later a large injection of warm olive oil is given. The evacuation that follows is usually painless and the thick coating of ointment prevents contamination of the sutures. This procedure repeated daily provides for the restoration of the function of the bowel without appreciable suffering to the patient.

One striking proof of the comfort to the patient of this method of operating is the rarity with which any difficulty of micturition occurs.

To conclude, I trust I have made my position clear for the ensuing discussion, and my excuse for raising what may be considered a commonplace subject must be that many surgeons at the present day are practising the ligature and cautery methods of operation, and that such methods I venture to assert, in the words of Heister, are "often pernicious" and are certainly without reason or principle in their design and execution.

NOTE.—I must take this opportunity of expressing my thanks to T. W. P. Lawrence, F.R.C.S., Curator of the Museum, University College, London, for his very kind assistance in connection with the illustrations.

CALABRESE has studied the changes in oxidation in healthy persons on a diet of rich or poor in chlorides, and has found that as chloride of sodium is decreased there is a greater decomposition of albumins; he has studied the effect on the blood and found that it became poor in corpuscles and in hæmoglobin. Chloride of sodium aids digestion, not only as a condiment, but as an indispensable element for maintaining the normal condition of the organism.—*Medical Record*, vol. lxvii, No. 4.

ON

DIPHTHEROID SORE THROAT.

By SIR LAUDER BRUNTON, M.D., LL.D.,
F.R.S.

I DARESAY many of you know that people generally are accustomed to look upon some forms of sore throat as infective, and I well remember when I was in charge of the laryngeal department at St. Bartholomew's Hospital that I suffered from sore throat much more frequently than at other times. I was frequently inclined to associate a particular sore throat which I suffered from on a certain day with infection from some of the patients whom I had seen in the out-patient department. But these were all vague observations, and I could not prove the contagious character of these sore throats. It is very difficult indeed to be certain of the nature of some sore throats, and the difficulty was impressed upon me very strongly by a case which I once saw. This case also showed what a long time the diphtheria bacillus may remain in a latent condition, or at least in a condition where its infective character is not recognised, and yet may afterwards cause the most virulent symptoms. The case to which I refer is that of a lady, one of the most distinguished lady-graduates in medicine of the London University, Miss Prideaux, who was house surgeon to the Paddington Green Children's Hospital at the time I was physician there. One day she was not looking well as I made my rounds, and I asked her what was the matter. She said she had a sore throat, that she was very liable to sore throats, especially when in hospital, and she thought this was just one of the ordinary kind. On looking at the throat, I found that the whole back of the pharynx was of a uniform red colour, and the uvula and the palate I thought looked slightly cedematous. There was absolutely no trace of any membrane, and so I thought very little more of it. I was going away for a holiday at that time, and was away for two or three weeks. On my return I heard, to my horror, that Miss Prideaux was dead of the most malignant form of diphtheria. After I had seen her a membrane had appeared, great dyspnoea set in, and she died. At the post-mortem examination the membrane was found not only in the larynx and trachea, but right down in the smallest bifurcations of the bronchi.

Now, one thing that led me not to think of diphtheria in connection with Miss Prideaux's sore throat was this: there was no case of diphtheria in the hospital, and there had been no case in the hospital from the time that her term of office began. So far as I knew she had not been in contact with any case of diphtheria. At that time the pathology of the disease was not very well understood, and a good many attempts were made to explain the occurrence of this isolated case of diphtheria. It was supposed to be connected with the drains, or with bad smells; but no definite connection could be traced to any source of infection. It was only after recent investigations had shown that the diphtheria bacillus may remain latent in the throat of people who are apparently healthy for many weeks or even months that I came to understand the possibility of infection in this case. Shortly before she was taken ill one of the nurses had had a slight sore throat, and was confined to bed for half a day. This nurse had been in attendance on a case of diphtheria before Miss Prideaux came on as house-surgeon, and I have very little doubt now that the nurse, although never herself ill, except for this half day, had acted as the bearer of infection from the child in the ward whom she had previously nursed to Miss Prideaux, who had come and looked after her. No doubt there are other cases of sore throat which are infectious, but you will find that diphtheroid sore throats are said, in one of the best text-books on medicine, viz. Osler's, not to be as a rule infectious. Now, I have seen one example of the non-infectious kind which struck me very much many years ago. I was attending one of my former colleagues here, the late Dr. Farr, when he was very ill. He had filled an important position at the College of Surgeons, and when he was so seriously ill his old friend the President of the College, Sir William Jenner, came to see him. I was very much disturbed by the appearance of a membrane covering the whole of the soft palate of Dr. Farr's mouth, as well as the uvula. This membrane was of a thick, creamy, even appearance, and I thought it was diphtheria. Jenner said, "No, it is not diphtheria; I think it is more allied to a sort of thrush. But," he said, "although not infective like diphtheria, it is of evil omen, because it shows great depression of the patient's vital forces." And he turned out to be right. This was a diphtheroid inflammation, not infectious, but of evil omen.

The cases which I have to bring before you to-day show, however, that these diphtheroid sore throats may not only be difficult to diagnose from true diphtheria, but may really be infective. The first case I have to mention is that of a patient named G—, who was suffering from exophthalmic goitre, and was in Elizabeth Ward. On December 10th she began to suffer from sore throat. The throat became red, the tonsils became enlarged; there was a considerable exudation on both tonsils resembling that of ordinary diphtheria, but upon removing this exudation the surface below did not bleed. The patient was ill for about five days. The temperature rose to 102° on the first day, to 103° on the second day, and then began to fall. On the sixth day it had resumed the normal. On examination of the membrane bacteriologically it was found that diphtheria bacilli were entirely absent, and that only cocci were present. I have not seen from the report whether these cocci were purely of one sort, or a mixture of streptococci and staphylococci as was found in the other cases.

The next case was one which occurred some time afterwards, and between this case and the first we could find no connection. It is possible, however, that there may have been some connection between the two which we have been unable to discover, just as there was in the case of poor Miss Prideaux between her and the patient who had been in the wards before she was taken ill. The second case was that of E. L—, who was in the ward for gastric ulcer. On January 27th she began to complain of sore throat, and on looking into the mouth the uvula was found to be inflamed and oedematous, as were also the tonsils, and patches of a greyish exudation were present, both on the uvula and on the tonsils. Here also the fever lasted for between four and five days, at the end of which the patient recovered. Bacteriological examination showed that the diphtheria bacilli were entirely absent, and that the organisms which were present consisted of mixtures of staphylococci and streptococci. This case acted as a focus of infection in the ward. The patient who was in the bed next to her also had sore throat following upon this as the first case, and one of the patients at the other end of the ward came and sat beside E. L— for a minute or two only, after which she went back to her own end of the ward, and she too got a sore throat.

E. L.—'s bad throat began on January 22nd. D—, another patient who was in for gastric ulcer, began to suffer from sore throat the next day. Her throat presented much the same appearance as did E. L.—'s. There were numerous rounded greyish patches of exudation on the right tonsil. On January 30th another patient began to get ill, named R—, who was in hospital for chorea. The symptoms she presented were very much the same as those of D—, but no bacteriological examination was made of her throat. A day or two afterwards, on February 2nd or thereabouts, another patient, M—, who was suffering from albuminuria, became affected in much the same way. There was in her case much exudation on the tonsils, and there was the same result on bacteriological examination, viz. that diphtheria bacilli were quite absent, and streptococci and staphylococci were present. In her the fever lasted for a shorter time—only four days—and it did not run very high, the highest temperature being 101.4° on the second day. The next case occurred a good while afterwards, on March 26th. This was a patient named P—, who had been admitted with mitral regurgitation. I shall read the notes of this case more at length, because it is a very interesting case. On March 26th the patient complained of headache and sore throat. There was no rise of temperature, and nothing could be seen on examination of her throat. There were enlarged and tender glands on either side of the neck at the angle of the jaw. On the morning of the 27th a distinct greyish membrane appeared on the left tonsil. Neither tonsil was enlarged nor inflamed. The fauces were slightly injected, and on removal of a portion of the membrane there was no bleeding surface observed. An examination of this membrane under the microscope showed the presence of many bacteria, both bacilli and cocci, and the patient was removed to Radcliffe Ward. At six o'clock the same evening a similar membranous exudate appeared on the right tonsil, but nothing was seen on the palate. The condition of the throat appeared so much like that of diphtheria that I judged it unsafe to leave her in Elizabeth Ward, and she was transferred to Radcliffe Ward. Pending the examination of the exudate we administered 6000 units of antitoxin subcutaneously. She improved quickly, and after about a week or so was removed back again to Elizabeth Ward. A careful

examination of the membrane was made, and this was the result, that although in the first report of an examination made in the wards numerous bacilli were stated to be present, yet in the more careful examination made in the pathological department it was found that no diphtheritic bacilli were present, but virulent *Streptococcus pyogenes* was present in large amount.

The next case was that of a child *æt.* 9 months. On March 27th it began to suffer from a croupy cough, and two days afterwards it had laryngeal spasm, with considerable recession of the chest and a temperature of 101° . On March 31st 3000 units of antitoxin were given. The child was better next day, but on April 7th it became much worse, and its temperature rose to 104.6° . On April 3rd tracheotomy was performed, on account of the extreme difficulty of breathing. After this the child became comfortable as long as the tube was in: but on trying to remove the tube the difficulty of breathing immediately returned, and it was not until April 21st that the wound was completely closed. On examination of this child's exudate it was found that no diphtheria bacilli were present, but virulent streptococci were found in the tracheal mucus, and in addition virulent *diplococcus pneumoniae* were present. It would appear that the first infection, which one would say clinically seemed to be that of diphtheria, was really due to the streptococcus, and that the rise of temperature afterwards was due to the *diplococcus pneumoniae*. Here, then, we have a case which clinically looked very much like diphtheria, but received no marked benefit from antitoxin, and was shown by the bacteriological examination not to be a true case of diphtheria, but one of diphtheroid infection.

The last case I shall mention to you is that of J. L.—, *æt.* 15 months. On April 29th the child had a bad cough and his nose bled. On May 4th he had a croupy cry and cough, with difficulty in breathing, as shown by the recession of the chest on inspiration. There was a blood-stained discharge of a greenish-yellow purulent character from the left nostril. The lips were ulcerated and bled when touched. The inside of the mouth was also tender, and the mucous membrane abraded in some parts. There was no definite membrane to be seen. On the 5th, 6000 units of antitoxin were given. On the 7th the nose

became cleaner, the temperature fell almost to the normal, and remained nearly at this height until the 12th, when a somewhat measly antitoxin rash appeared, and the temperature rose to 100.8° . However, the temperature soon subsided, the child seemed to get well quickly, and was discharged on the 22nd. On looking at that child, when I saw the nature of the discharge, it seemed to me it was not likely to be a case of pure diphtheria, for as a rule the diphtheria bacillus *per se* does not give rise to the formation of pus. The diphtheria bacillus, when it settles on a membrane, does give rise to an increase in the number of leucocytes in the mucous membrane, but as a rule these leucocytes do not reach the surface in the form of pus, but undergo a hyaline change before they get to the surface, and form part of the characteristic membrane. So when I found there was free pus, I came to the conclusion that it was not certain whether the diphtheria bacillus was there or not, but that if it were there it must be associated with some other organism which was leading to the formation of pus; and on examination this was found to be the case. Diphtheria bacilli were found in considerable quantities, but in addition we found a number of streptococci and staphylococci.

The cases which I have described are interesting as showing the infective nature of some diphtheroid sore throats, and all the more, I think, because in his book Osler mentions that the diphtheroid cases are looked upon by many as not being infective, but are regarded in the same light as Sir William Jenner regarded the case of Dr. Farr. But we learn from these cases that they may not only be infective, but very infective, as in the case of the patient who only spent two or three minutes at the bedside of E. L.—in Elizabeth Ward, and then went back to her own end of the ward and got the same kind of sore throat from which E. L.—was suffering.

The treatment adopted in all these cases was very much the same. It consisted in swabbing the throat with a solution of perchloride of mercury of varying strengths, from 1 in 1000 to 1 in 500, and using a gargle of chlorinated soda freely. In one case, that of D—, the mistura guaiaci was used in place of washing the throat with perchloride of mercury; and in the case of P—we used a four per cent. solution of formalin to wash the throat with; but in all the cases, except

for the small children where gargling is impossible, a gargle of chlorinated soda was used. It is stated that some diphtheroid inflammations may be followed by paralysis, just as diphtheria may be followed by it. Whether this is the case I cannot positively say. But at any rate I think it is advisable in cases of this sort to be somewhat careful as to the after-treatment, lest you should get a general infection of the streptococcic character from the local inflammation. One of these patients suffered a good deal from decayed teeth, namely R—; she recovered very rapidly; but I have seen one case of ulcerative endocarditis where the source of infection seemed to be the teeth. This was a patient whose teeth were very much decayed, and where abscesses had formed at the root of a great many of them. The pus was, of course, more or less confined by the teeth which still remained partially fixed in the alveoli. They were there under pressure, and I think that from the alveoli the streptococci had been absorbed into the blood and there produced the ordinary oscillating temperature and affection of the heart, with ultimate death.

Inoculation Cancers.—Milner does not regard any of the cases on record as conclusive in regard to the actual occurrence of cancer from inoculation during operations. The cancer cells may be attracted by way of the blood to the site of the wound, or the tissues may be injured by the cytotoxic fluids, etc. It has been found impossible to induce the development of cancer on intact epithelium by implantation of cancer cells, with the exception of the epithelium of the ovary. In every case reported of so-called "inoculation cancer" on any other epithelial surface it is impossible to exclude the possibility of retrograde metastasis or of multiplicity of the tumours. There is no positive observation on record of the unintentional transmission of cancer from one individual to another of the same species. The prevailing fear of the contagiousness of cancer is probably exaggerated and unfounded, but at the same time none of the present prophylactic measures should be neglected. Further studies of these "inoculation cancers" may lead to interesting and important results. More than 200 articles were reviewed for this monograph, and the data are carefully analysed and classified, with the above conclusions.—*Journ. A. M. A.*, vol. xlv, No. 2.

THE DIAGNOSIS AND TREATMENT OF NON-PERFORATING GASTRIC ULCER.

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GENTLEMEN,—I have no doubt you will remember that I drew your attention, on a previous occasion, to the subject of ruptured gastric ulcer. To-day I am going to refer to the chronic form of that disease, in which no rupture takes place. Not that I wish you to infer that there is any essential difference between these two forms. There is a chronic group of cases and there is an acute group of cases, but there are intermediate forms that connect these two groups together. I am speaking of these two varieties because, from a clinical point of view, it is convenient to do so, and because, as you will see, the surgical treatment is essentially different in these two varieties.

In the case of a ruptured gastric ulcer there is no doubt that immediate surgical interference is demanded, but with chronic ulcers of the stomach there is room for difference of opinion. Some physicians and surgeons as well still regard all operations on chronic ulcers as unnecessary; and it is because I do not take this view, and because I am desirous of pointing out to you what are the indications for operating on them, and because I can show you to-day a result of such an operation, that I have selected this subject for my lecture.

Let me start by introducing to you the patient, and relating to you his clinical history, and we will then pass on to consider, as we usually do, the points of the case, one after another. He is, you see, at the present time a healthy-looking man. His age is 37, and he says he can do as hard a day's work as ever he could; he works as a labourer, and is usually engaged in the occupation which annoys so many of us, of picking up the streets for the purpose of either putting down or taking up gas, water-pipes, etc. He admits that he has drunk a good deal in his time, and has had to attend at several hospitals on account of severe indigestion during the last seven years. Up to the time that he came under my care he had only been treated as an out-patient, but latterly he had been getting gradually worse, and was at length persuaded by his doctor to place himself under my care. When

I first saw him he told me he had not had a meal for some years without suffering severe pain after it. At times he was quite unable for several days to take any solid food whatever. His pain usually came on shortly after taking food. It was referred to the region of his stomach and also to his left shoulder. The pain was generally but not always relieved by vomiting. The vomiting was usually accompanied by a considerable amount of retching and straining, and he remembers on one occasion bringing up a considerable quantity of blood, but as he was sure that this relieved him of his pain he thought nothing further about it, and did not regard it as a matter of any importance. He said he had always been a thin man, but had lost flesh lately to a considerable extent, and felt weak and unable to do his work. As soon as I saw him it is needless to say that I realised his was no ordinary case of dyspepsia, and what is more, came at once to the conclusion that in all probability he was suffering from a gastric ulcer that would demand surgical interference. He was placed in bed and fed on slop food for a while, so that we might watch him, and see if dieting and medicine alone would be sufficient to effect a cure of his ulcer.

And here let me draw your attention to the exact method of treatment adopted, for it is very important to clearly understand what is adequate medical treatment in order that it may be persevered in for several weeks before recourse is had to the surgeon's knife.

First, in all bad cases attended, as this was, by much pain, the patient must be kept absolutely at rest in bed. Secondly, he must for several days together be fed by nutrient enemata. Thirdly, the bowels must be carefully regulated.

He was placed in bed, and nothing but milk and water with a little lime-water and occasionally some beef-tea administered. Food was taken in small quantities, about two or three ounces, every two hours. Small doses of our white mixture—viz. mag. sulph. 3j, mag. carb. gr. x, aq. menth. virid. 3j—were administered daily in sufficient quantity to make the bowels act regularly.

Under this treatment the pain somewhat abated but did not disappear, and a week later rectal feeding was begun and continued for seven days, at the end of which time mouth feeding had to be resumed, as he became nauseated by the enemata.

The enemata bulked about four ounces, and were composed of egg, milk and brandy, beef-tea diluted with water, chicken-broth, etc.

The patient improved up to a certain point under this treatment, but progress beyond this point seemed impossible, and the least attempt at taking solid food brought on the pain again. After some weeks of this treatment it was clear that nothing more could be expected from medical treatment, and surgical interference was suggested. The patient readily assented to operation, and his abdomen was accordingly opened just to the left of the middle line. I felt considerable doubt in expressing an opinion as to the nature of the disease at this time. It seemed quite possible it might be one of cancer of the stomach, though the absence of hæmorrhage during his stay in the hospital, his age, and the duration of his symptoms, made the presence of a chronic ulcer more probable. When the abdomen was opened the stomach was found to be drawn up towards the region of the liver near its pyloric end, and much thickened in this region. The thickening extended slightly to the duodenum as well. After a careful examination of the stomach itself and of the neighbouring parts as well, I decided to perform a gastrojejunostomy, and as the stomach was so firmly bound down as to render the posterior operation one of extreme difficulty, I effected the junction by the anterior method. A double row of stitches was employed for the purpose, and the patient made a good recovery. By the end of ten days he had begun to take solid food, and now, two years after his operation, he is here to testify to the relief from pain and suffering which it has afforded him.

Let us at once go to the root of matters and ask ourselves what are the indications for operative interference in these chronic gastric ulcers; and remember, I am not talking of duodenal ulcers, but of gastric ulcers only. Chronic duodenal ulcers—or shall I call them pyloric ulcers?—must be left for a future occasion. The symptoms on which we usually rely are indigestion of a very severe type, bleeding and anæmia, whilst vomiting, tetany, and excruciating pain are sure to be present in varying degree in the worst cases, and some of them are common to duodenal ulcers as well.

By indigestion of a severe type I understand the dread of taking food, because it produces so much

inconvenience, coupled, of course, with pain, flatulence, etc.

Flatulence occurs in some instances almost as soon as the food is swallowed, and but little relief is obtained from this condition until either some hours have elapsed or quantities of wind are belched up from the stomach, accompanied probably by acid regurgitation of fluid into the mouth. If more than a small amount of this fluid rises in the throat, the patient naturally gets rid of it, and may almost be said to vomit. Sometimes the distension of the abdomen which the patient complains of, and which percussion will show you is mainly confined to the stomach, is passive in character, and the patient will express that fact by telling you that he cannot get the wind off his stomach; and if this is so look more gravely on this symptom, for it probably indicates that the stomach is dilated, and its muscular walls weakened by distension, so that it is unable to dispel its contents. At the same time, bear in mind that even this condition may be present when no ulcer exists and no operative interference is needed. Its persistence, however, should attract your attention and lead you to make inquiries with a view to ascertaining whether the other symptoms to which I have referred are present as well.

Pain will usually accompany this condition—not the excruciating pain which I have just alluded to, but in many instances little else but what we may describe as discomfort, more or less severe. If, however, the pain is such that the patient says he is doubled up with it, and that it is of a severe cutting or gnawing character, and is confined, perhaps, to one particular part of the abdomen, possibly to that region where you know the pylorus lies, its significance is vastly increased; and the probability that it is accompanied by a gastric ulcer becomes almost a matter of certainty. You should carefully percuss out the area of the stomach, when the symptoms lead you to believe that it is dilated, and in all probability you will find by its area of tympanitic resonance that it undoubtedly is so. If your patient is thin and emaciated, as many such patients are, you will obtain a better idea of the size of the stomach by inspection of the abdomen than by any other method. The line of the greater curvature will be seen almost as clearly as if the abdominal walls were non-existent, and the roundness of the anterior wall of the stomach will be

equally evident at the same time. Its exact size can also be determined by washing it out and measuring the exact amount of fluid that it contains. A healthy stomach holds from one and a half to two pints. Washing out is best effected with a soft red rubber œsophageal tube, to which is affixed, by means of a piece of rubber tubing, a funnel. The stomach can then be filled by pouring water into the funnel, and its contents syphoned out as often as may be necessary. There is one curious point about these stomachs to which I would draw especial attention: they are perfectly atonic, and do not contract upon the fluid and attempt to eject it, and they dilate without pain or discomfort. I never see this process of passive dilatation proceeding without recalling Mr. Weller's remarks to his son when they both went to a tea-party together: "There's a young woman on the next form but two as has drank nine breakfast-cups and a half; and she's a swellin' wisely before my wery eyes." The same passive dilatation is often witnessed when the stomach is distended with gas by the administration of the two halves separately of a seidlitz powder, under which treatment it rapidly distends, but usually without inconvenience or discomfort.

Vomiting, especially when it occurs regularly after taking food, is a symptom of great importance, but it does not always occur even when bad ulceration is present, or it may come on only at intervals, and then intermit for a while, or it may be attended with dangerous hæmorrhage, a symptom I shall have to refer to again. The kind of food which the patient takes has a good deal to do with it. I have often observed that a patient who is on an ordinary mixed, fairly wholesome diet will vomit with great regularity, but a slop diet in which milk is administered in some quantity will at once cause the vomiting to cease, and it will not recur till the food is again changed. It is almost needless to point out to you in connection with the question of vomiting that such patients are usually emaciated, and you will generally find that they have lost several stone in weight.

The remaining symptom to which I wish to draw your attention is tetany. The occurrence of those peculiar spasms which are described by this name in connection with diseases of the stomach has long been known, but attention has been specially directed towards this condition during the last twenty years or more.

The more severe type of spasms is seldom seen, but the slighter degrees of this condition may often be found if they are looked for.

In Trousseau's 'Clinical Lectures' an excellent and lifelike picture of the disease is to be found, but to be fully appreciated these spasms must be seen and carefully observed. When they are well marked and violent they are usually the precursors of a fatal termination, and some authors limit the term "gastric tetany" to this severe type only.

So far as my experience goes the severe type is comparatively rare; but the slighter forms, which differ only in degree from the acute, may often be detected if inquiry is directed towards that object. You may often get a history of cramps of various muscles, especially in the limbs; tingling and a sensation of pins and needles in the extremities; and sometimes you will find that a peculiar sensation of tingling is experienced when the stomach is washed out, especially if the washing is carried out in a perfunctory fashion. Bear in mind washing should have for its object complete cleansing, and unless you wash out the stomach until the water returns perfectly clean and clear you have not effected your object. You may have to wash out as often as half a dozen or even a dozen times in succession before you extract all the stomach contents.

The severe attacks of tetany are usually preceded by almost uncontrollable vomiting. The attack starts with the tingling above alluded to, and this is soon followed by a tetanic spasm of the hand in which the palm is diminished in size by the approximation of the thenar and hypothenar eminences. The thumb is flexed into the centre of the hand and the fingers are slightly bent as if the hand was just about to be introduced into the rectum or vagina for purposes of examination. The wrist and arm may be partially flexed, and the muscles are tense and rigid. Similar spasms may take place in the legs, but they are usually less marked there. The body muscles, especially those of the abdomen, may participate in the general spastic condition.

Intense pain, coupled with difficulty of breathing and cyanosis, may accompany this condition, which if unrelieved speedily brings about a fatal issue.

These attacks can generally be somewhat controlled, at least for a while, by antispasmodics, bromides, and chloral, coupled with the administra-

tion of liquid food, and by washing out the stomach in the manner above described.

You will, of course, not get all these various symptoms present in any one case; but when you have come across a few instances of the kind, and realize the possible consequences of the disease, you will be inclined not to regard a gastric ulcer merely as an interesting condition that demands only medical treatment, but you will at once recognise that if a case does not yield to simple treatment by dieting, drugs, and bed, the abdomen should promptly be opened, the condition investigated, and proper operative treatment proceeded with. Do not delay too long before advising surgical interference. As soon as you are satisfied that medicine is incapable of effecting a cure do not hesitate to resort to surgical means.

There is another curious point about these severe gastric ulcers which I have noticed, and which so far as I remember I have not seen elsewhere alluded to. They do not take an anæsthetic well as a rule; they do not take it quietly and easily. This is usually due to spasm of the jaw, which causes it to be fixed and allows the tongue to fall back, or to spasm of the diaphragm and abdominal muscles. These spasms interfere greatly with the course of the operation, and force the operator to hold his hand, and perhaps stand by as a passive spectator for a while until the spasm has passed off and he can again resume his operation. Only the other day I was doing an operation on a case of this nature, and what is more I had the aid of one of the most skilled anæsthetists who could be found in London, and yet I calculate nearly half of the time spent on the operation was accounted for by those intervals during which I had to stand and look at the spasms of the patient, but was unable to progress with my operation. Eventually the operation was concluded with perfect success, but not without considerable anxiety being caused both to the anæsthetist and myself. I have little doubt that these spasms that occur during the course of an operation must be placed in the same category as the tetanic spasms I have just referred to.

Before we actually pass on to consider the nature of the operation that is performed for the relief of these ulcers, let me relate to you some few of the conditions which I have found on opening the abdomen, and you will see that my note of warning

as to the need for earlier surgical interference is not uncalled for.

The first case that I will refer to was that of a man who, before he came under my care, had had symptoms of gastric ulcer, but these had disappeared several years previously. When I first saw him there was but little doubt that he was suffering from gall-stones. He constantly had attacks of pain in the region of the liver, and was temporarily jaundiced. His stools were at these times almost entirely devoid of bile, though they were not absolutely clay-coloured. From the description which he gave of his symptoms it seemed most probable that he had passed several gall-stones. He suffered from aggravated dyspepsia.

I opened his abdomen and found a mass of adhesions connecting the pyloric end of the stomach to the under surface of the liver. At first sight the mass seemed to be malignant, but a more careful examination of it made me come to the conclusion that it was in all probability inflammatory, and this conclusion I arrived at for the following reasons: First, there were no nodular masses of malignant growth in the liver, which almost certainly would have been the case at this stage of the disease had it been of a malignant nature. Secondly, though the mass in question involved the stomach as well, there was nothing whatever in his symptoms to warrant a suggestion of malignant disease of that organ. I began, therefore, to detach the adhesions in order to discover the gall-stones which I was convinced were present, and after very considerable trouble I discovered, first the gall-bladder, and secondly, the common duct, which contained several stones of large size in addition to some small ones in the gall-bladder. I incised the duct, removed the stones, and sutured my incision. The gall-bladder I opened, emptied, and attached to the abdominal wall. Recovery was uninterrupted.

Had the operation not been so prolonged and difficult a one, I might have been tempted to perform a gastro-jejunostomy as well, for it seemed impossible to understand how the pylorus could be patent with such a mass of inflammatory tissue in its immediate neighbourhood. I decided, however, to defer this to a future occasion. I have little doubt, after reviewing the history of this case and the condition which I found at the time of operation, that a gastric ulcer had been in existence, and had set up some perigastric inflammation on the

outside of the stomach, in consequence of which the bile passages became infected and gall-stones resulted, for there was no evidence whatever of the presence of gall-stones until long after the appearance of the gastric ulcer, which bled severely and threatened his life on more than one occasion, though it eventually healed. Had an operation been performed when the ulcer was at its height or before it had reached this stage, the subsequent formation of gall-stones would in all probability have been prevented.

The patient's symptoms were so far relieved by the removal of his gall-stones that he declined to undergo any further operation.

In almost all the cases in which an operation is performed on account of an extensive ulcer of inflammatory or of malignant nature adhesions are almost certain to be present. These adhesions, as a rule, form a hardened connecting mass stretching from the pylorus to the liver or diaphragm. They cripple the pylorus and render it incapable of giving free passage to the food, even though it may be patent, with the result that the stomach gets over-loaded and dilated, and the ulceration which first started this state of affairs is aggravated by the secondary changes which it has set up in the wall of the stomach and in the neighbouring parts.

You will see that the case we have before us to-day illustrates this point very clearly, that the inevitable result of a gastric ulcer which remains uncured for any considerable length of time is to set up changes outside the stomach in the neighbouring viscera (perigastritis.) These adhesions cripple the movements of the viscera, more especially the stomach, give rise to violent dyspepsia, and aggravate the ulcer which first produced them.

When this sequence of events is set up, especially if the pylorus is incapable of transmitting its contents, there is but one remedy, and that is to perform some plastic operation which will allow the free passage of food from the stomach to the intestines, and restore the patient to a state of health.

The next question to consider is the exact nature of that operation. I have already somewhat anticipated that point by alluding to the operation of gastro-jejunostomy which I performed on this patient. There are two positions in which this junction may be effected—(a) behind the transverse colon by tear-

ing through the transverse meso-colon, (b) in front of the transverse colon, which a moment's reflection will convince you entails an unnatural transposition of the parts, for to effect this the jejunum must be brought round the great omentum as well as across the front of the transverse colon, as already stated. There can be no question that the retro-colic method is the preferable one, if it can be performed. It was not possible in this patient, and I therefore did the anterior operation.

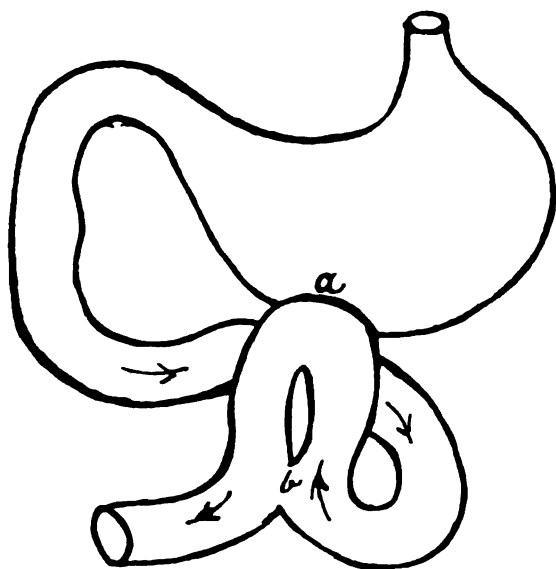
You will, I am sure, understand more easily the advantages and defects of the operation if I direct your attention to a diagram which I have drawn on the blackboard.

The upper part of the jejunum, about five or six inches below the duodenum, is now pretty generally recognised as the most suitable point to be connected with the stomach. The jejunum is so movable at this spot that it can be easily connected to the stomach without any undue tension on the surrounding parts.

But it cannot be denied that there is a disadvantage attending an operation thus performed. The bile and pancreatic fluids must follow the line indicated by the arrows and pass through the stomach before they reach the remainder of the intestine. There is no doubt that in many instances this does not in the least interfere with the future progress of the case, and the relief to the patient obtained from the operation is both rapid and permanent. Unfortunately, however, the result is not by any means in all cases a success. A few days after the operation the patient may begin to vomit, bring up quantities of dark fluid, and shortly dies of inanition and exhaustion. This result is generally said to be due to what is called the vicious circle. In other words, it is supposed, and probably with considerable approach to correctness, that the bile and pancreatic fluids, having found their way into the stomach, are unable to make their exit from it, perhaps owing to an inefficient opening between the stomach and jejunum. Whatever the exact explanation may be, there is no doubt that many patients on whom gastro-jejunostomy has been performed have lost their lives in consequence of the vicious circle, as it is called.

Various suggestions have been made to obviate this occurrence. It hardly comes within the scope of my lecture to-day to recapitulate them. But this

much I may say—that all modern forms of gastro-jejunostomy recognise the possibility of the vicious circle supervening, and by some means or other endeavour to avoid it. The simplest plan to my mind of effecting this object is, first, to effect a junction between the stomach and jejunum at (*a*), and then a second junction between the two loops of jejunum where they touch one another at (*b*). This plan was, I believe, first adopted by Lauenstein, and has recently been strongly recommended in this country by Atkins, of Cork. Its effect is to carry the bile and pancreatic juice direct into the intestine just below the opening where the stomach contents enter it, thus imitating as nearly as possible the natural relationship of the parts. Since I adopted



this plan of treatment I have had no visions haunting me of the vicious circle, and have almost ceased to believe in its existence. The only objection attending this plan that I know of is, that it involves making two openings instead of one, and therefore slightly prolongs the operation, a small matter when we reflect on the success of such a mode of procedure. The question we have to look to is the result of such operations, and if we turn to the latest statistics as given by Mayo Robson and Moynihan, we shall find a record of 218 operations, in which 211 made a good and successful recovery. What more can I add in favour of this operation?

It now remains to consider further the subject of bleeding, which, as I have just stated, threatened the life of one of my cases on more occasions than

one. Bleeding is much more common in acute than it is in chronic ulcer, but it may occur in both kinds. Bear in mind, however, if you please, that when an operation is performed for the hæmorrhage which occurs in connection with so-called acute ulcers, the ulcer may not be discoverable at the time of operation, as you will see in the case I am about to relate to you. In other words, it seems probable that we may be obliged in the future to somewhat modify our views on these cases and speak of them as sudden capillary hæmorrhages from the stomach rather than hæmorrhages consequent on gastric ulcer. For the present, however, I shall retain the more generally accepted nomenclature for the sake of convenience, and speak of these cases of bleeding as dependent (*a*) on acute ulceration, (*b*) on chronic ulceration of the stomach.

The acute variety, which I propose to allude to first, is well illustrated by a case which I saw with Sir Dyce Duckworth, in a young woman æt. 24 years. She had suffered for several months from the usual symptoms pointing to acute gastric ulcer, and was profoundly pale and anæmic. I was asked to see her on account of a severe attack of bleeding, which had rendered her almost pulseless, and which seemed, if untreated surgically, liable to be attended by a fatal issue.

I opened her abdomen in the way which I have already related, and need not now dwell upon further. The outside of the stomach appeared pale, but gave no other indications of its diseased condition. I accordingly made an incision about three inches long on its front surface and rapidly examined the mucous membrane both with the finger and by inspection. There was no ulcer to be detected. I wish particularly to draw your attention to this fact. I am not, of course, prepared to say no tiny ulcer existed, for I am well aware that such ulcers have been described as being found after death; and it is very easy for a surgeon who knows the importance of finishing his operation with all reasonable speed to miss such an ulcer as I am alluding to. There was, however, one spot from which blood was oozing in small quantity. Round this point I threaded a small stitch of fine silk, taking care to transfix some portion of the mucous membrane, so that there might be no chance of the ligature becoming detached before healing had taken place. Subsequently I found a second

bleeding spot and ligatured it in the same way. The opening in the stomach was then closed in the usual way with a double row of stitches, the inner of which united mucous membrane only and the outer muscular and peritoneal coats. The patient made a good recovery.

You will now see what I mean by saying that possibly we shall come to regard these cases, not as instances of gastric ulcer at all, but rather speak of them as capillary hæmorrhage. A fair number of these cases have now been recorded. Three were, I well remember, related by Mansell Moullin at the Clinical Society * and you will find others recorded if you search for them. Further observations are needed before we can accurately determine the exact pathological condition that gives rise to this condition.

From my own personal experience I cannot say much of the severe hæmorrhage which supervenes during the course of a chronic gastric ulcer. One of the patients who are referred to in this lecture, as I have already told you, nearly lost his life on more than one occasion from this cause, but he was not under my care at the time. There, is however, no doubt that these cases when they are severe should be treated by surgical means and can be so treated with considerable success.

After the successful results which have attended the operation of gastro-enterostomy, there is little doubt that in many of the chronic cases in which bleeding, supervenes, not only should an attempt be made, if the patient is strong enough, to arrest the bleeding, but that the stomach will be put in a condition of rest, and a better chance of complete cure will be insured by performing a gastro-enterostomy at the same time.

I have already pointed out to you the need for co-operation between the physician and surgeon; and let me in conclusion remind you that dieting, rest in bed, coupled with rectal feeding in order to afford as complete rest as is possible to the stomach, must be thoroughly carried out first of all. If these plans of treatment fail, and the patient does not steadily improve under their employment, surgical treatment is undoubtedly demanded and will in all probability bring about a successful issue.

* See 'British Medical Journal,' 1900, vol. ii, p. 1190.

SOME HEALTH RESORTS IN FRANCE.

No. IV.

Vic-sur-Cère.—The medical visitors left La Bourboule in their special train on September 8th before five o'clock in the morning and arrived at Vic-sur-Cère shortly before noon, where they were entertained to lunch at the Grand Hotel, erected and fitted up by the Orleans Railway Company. One great advantage of this watering-place is the climate of the Cantal country, with its abundance of sunshine and health-giving breezes. The air is extremely pure, there is no dust, no stagnant water, and the weather in late spring and early autumn is magnificent. The waters of Vic-sur-Cère are slightly purgative, and are recommended for liver complaints and intestinal affections. The party left Vic-sur-Cère early in the afternoon for Royat, reaching that place about seven in the evening.

Royat.—The medical visitors were inspecting the bathing establishments of Royat before eight on the morning of September 9th, and at ten o'clock they assembled at the Casino to hear Professor Landouzy give one of his eloquent addresses. The English members of the party were conducted round the baths by Dr. H. Brandt and Dr. E. Brandt. The waters are described as mixed alkaline, ferruginous and effervescent, containing some arsenic and lithium. The handsome swimming baths were much admired, and the sumptuous settings for the carbonic acid baths and the douching deserved the close inspection to which they were submitted. The excellent system for constantly renewing the water while the patient is bathing was also noted. This resort is useful for the treatment of anæmia, respiratory affections, gouty troubles, dyspepsia, and diabetes. Dryness is the dominating feature of the climate, and there is no sudden change after sunset, so that there is no fear of dampness. The season lasts from the middle of May to October, and to show that amusement is well provided for, the visitors were entertained to a performance at the Theatre of the comedy "La Boule."

Durtol Sanatorium.—Although September 9th was such a busy day for the party, time was found to go a short distance out of Royat to visit Durtol Sanatorium, kept by Dr. Sabourin, who personally conducted his visitors over his well-arranged establishment.

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* Specially reported for the Clinical Journal. Revised
by the Author.

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THE TREATMENT OF BRIGHT'S DISEASE.*

By J. R. BRADFORD, M.D., F.R.C.P., F.R.S.,
Physician to University College Hospital.

GENTLEMEN,—In seeking for a subject on which to address you this evening I thought it most desirable to select one which might appeal to all of us as practitioners, owing to the frequency with which we are brought face to face with the subject. Renal diseases, especially the inflammatory and degenerative forms included under the terms of "acute nephritis," "Bright's disease," and "granular kidney," are not only very frequent, but, according to the Registrar-General's returns, there would seem to be some evidence of at any rate an apparent increase in the number of deaths from these diseases. According to the recent statistics the average death-rate from Bright's disease per million living has apparently undergone considerable increase in the last twenty-five years. Thus, in the quinquennial period 1873-1877 the average death-rate per million living was, in the case of males 251, in the case of females 125, and in both sexes 212; whereas in the quinquennial period 1898-1902 the numbers were—for males 427, for females 336, and for both sexes 380. I do not wish to argue from these statistics that there has been a real increase of such magnitude, as it is possible that a great deal of it is apparent only and dependent on much more accurate diagnosis. It is not so very long ago, in 1827, that Richard Bright's first paper relating to dropsy and albuminuria due to gross lesions of the kidney was published. Our diagnosis is much more accurate now than five and twenty years ago, and it is more than probable that the statistics just quoted do not by any means include all the deaths from these renal diseases. Many cases returned as heart

* A lecture delivered before the Hunterian Society, London.

disease must often be dependent really on a primary renal lesion, as it is well known in hospital practice that many a case lectured on in the wards as one of primary mitral disease turns out really to be secondary mitral disease brought about by dilatation of the ventricle dependent on primary renal disease. One of the most difficult of clinical problems is to differentiate with certainty between some of these cases of cardiac failure secondary to renal disease and cases of primary heart disease. Cerebral hæmorrhage is also a malady which, as everyone knows, may be dependent on primary renal changes, and this is more especially true of the rapidly fatal cases of cerebral hæmorrhage. The consideration of these facts and many others—such as, for instance, the occurrence of inflammatory complications like pneumonia in latent renal disease, where the renal origin may be entirely overlooked unless the urine be systematically examined—shows that the number of deaths from renal disease must be even larger than the statistics of the Registrar-General show. We must never forget that renal diseases are not only fatal directly from the immediate results produced by the kidney lesion, but that in addition to this there is a general lowering of the resistance of the tissue, so that the patients succumb to some secondary infection and the primary renal origin may readily be overlooked. Lastly, in some renal diseases albuminuria is not constantly present, and this notwithstanding the fatal issue of the malady. This introduces a further source of error, but the number of such cases is undoubtedly small. Still, enough has been said to show that a very large number of deaths are directly or indirectly dependent on renal diseases, and especially on those included under the term of "nephritis," acute or chronic, and it is with the treatment of these forms that I propose to deal this evening.

It will be useful to consider first of all shortly the nature of the functional activities of the kidney in order, if possible, to obtain some general principles of treatment. The kidney has a well-defined excretory activity, as shown by the elimination of water, which is effected through the glomerular epithelium; secondly, it excretes a number of salts which are also excreted apparently by the glomeruli. Thirdly, it excretes certain nitrogenous principles, the most important of which, urea, is excreted by the tubules. None of these substances

are elaborated by the kidney, but are simply removed from the blood-stream by the selective activity of either the glomerular or tubal epithelium. It is probable, however, that the kidney synthesises some substances, *e.g.* hippuric acid. There is at the present time, however, no conclusive evidence that the kidney elaborates any internal secretion. In the next place, the kidney is an extraordinarily vascular organ, and has very intimate relationship, therefore, with the blood-pressure and the vaso-motor system. Speaking broadly, in disease of the kidneys we often find the excretory activity impaired, so that sometimes but little urine is secreted; at others, notwithstanding a copious excretion of water, there is a deficiency in the excretion of urinary solids, *i.e.* the so-called "solid urine." Further abnormal constituents, such as albumen, blood, etc., may be present in the fluid. Secondly, in many chronic renal diseases secondary effects are produced on the cardiovascular system, such as the well-known cardiac hypertrophy, high blood-pressure, thickening of the vessels, but it must not be forgotten that other cardiac effects are not uncommonly present, as, for instance, cardiac dilatation, and this may form a very serious or even fatal complication, especially of acute nephritis. Thirdly, renal disease tends to produce one or other of many forms of uræmia, and it is interesting to bear in mind that some of the most acute forms of uræmia may supervene in the course of chronic or even of latent renal disease. Fourthly, chronic renal disease leads to very great impairment of the general nutrition, as shown by wasting, and in some instances by the development of a cachexia. Fifthly, dropsy is a frequent accompaniment of some forms, but by no means of all forms, of acute and chronic nephritis. And lastly, there is, undoubtedly, in chronic renal disease a general lowering of the resistance of the tissues, so that secondary infections dependent on microbic invasion are frequent, and with reference to this it is important to bear in mind that such secondary inflammatory complications tend to run a very unfavourable course, and are often further complicated by the occurrence of toxic symptoms of uræmia.

In the treatment of renal disease it is desirable to bear in mind all these various effects of renal lesions and in discussing the treatment it will be most convenient to consider the acute and the

chronic forms separately, inasmuch as the main difficulties arise rather in the treatment of chronic than in that of acute nephritis.

In the acute affections, inasmuch as the excretory activity of the kidney is usually greatly impaired, it is essential to diminish the work of the organ as much as possible by diminishing the amount of the diet and by making it of as simple and unirritating a quality as possible, and further by promoting to the best of our ability elimination by other channels. There can be little objection in diminishing the input of food as much as possible in acute nephritis and acute Bright's disease, especially as there is a certain amount of evidence, both experimental and clinical, tending to show that acute lesions may entirely subside and the kidney apparently regain its integrity. It is probable that it is advisable, not only to limit the ingestion of food in the ordinary sense of the word, but also to diminish the amount of food taken by the patient. This, however, is a more arguable point than the diminution of the food itself, inasmuch as some writers aver that flushing the kidneys as much as possible with water or such simple drinks as barley-water is useful by causing the washing away of the epithelial *débris* blocking the tubes. The ingestion of large quantities of fluid may unquestionably be harmful by causing a hydræmic plethora and so increasing the work of the heart, and this is a point, as already mentioned, that should be carefully watched in all severe cases of acute nephritis. In acute renal disease there can be no question that milk is the most suitable diet, and that it should be given in small quantity and diluted. Three pints of milk is looked upon as a minimum diet for an adult, but I see no objection in acute renal disease to restricting the ingestion of milk to as little as a pint or a pint and a half in the twenty-four hours. We cannot arrest the excretion of urea, as some of it is formed in the metabolism of the tissues, but during the acute stage of the disease it is certainly advisable to cut down the work of the kidney as much as possible. In promoting elimination by other channels—namely, the lungs, the skin, and the bowel—there can be little question that the last is the most important, and I often think myself that we are too much influenced by purely theoretical considerations in our ideas as to the relative dependence of the skin on the kidneys and *vice versa*. It is very

easy to increase the elimination from the bowels, and we should remember that where the excretory function of the kidney is impaired urea and other substances are known to be excreted into the alimentary canal, whereas the excretion of urea in appreciable quantities by the skin is a rarity.

Further, a number of normal constituents of the urine are actually absorbed by the bowel, and therefore by purgation we still further diminish the work of the kidney. For all these three reasons it is eminently desirable to cause increased elimination through the alimentary canal, although, of course, we must beware of producing by the action of drastic purgatives a condition of enteritis. Purgation, then, is to be recommended as a means of eliminating water; as a means of bringing about a vicarious excretion of some of the solid constituents of the urine; and thirdly, by diminishing the work of the kidney, by the lesser absorption and subsequent lesser excretion of intestinal products.

The difficulties and differences of opinion as to the treatment of renal disease arise mainly in connection with the chronic forms of the malady. One of the most essential points that must influence us in our treatment of these maladies is the fact that in acute renal inflammations we have, as a rule, only to consider the effects of the renal lesion itself, whereas in the chronic disease a number of secondary effects have usually been produced, and the presence and extent of these must often materially influence our treatment. It will be convenient to consider, first of all, the effects produced by the kidney lesion itself, and to discuss how far, if at all, the renal lesions should influence our treatment. Albuminuria stands in the forefront of the direct renal lesions, and from time to time very different views have been held with reference to the consideration which should be attached to the albuminuria as such. Albuminuria from the point of view of treatment may be looked at from two points of view: one, the mere presence of the albumen in greater or less amount, together with the question whether the mere amount should guide us in the treatment. Secondly, is the albuminuria a true index of the nature and severity of the lesion present? It is obvious that in this way the albuminuria might be a guide to our treatment, even although not so from the mere amount present.

There can be no question that in the majority of

cases the modern view that the loss of albumen in the urine is not of very great moment directly is correct, and that therefore treatment need not necessarily be directed towards attempts to reduce the amount present in the urine. In most chronic renal diseases the daily loss of albumen is not very great, amounting to only a few grains, and in some of the most serious of chronic renal diseases, as in the granular kidney, the actual quantity lost is very small. Still, in some forms of chronic renal disease the daily loss may be considerable, as in the amyloid kidney and in some forms of chronic Bright's disease, where the urine is increased in quantity and at the same time contains a considerable amount of albumen. The daily loss of albumen is not as a rule greatest in those renal affections where the percentage of albumen is highest, because in such cases the quantity of urine is usually notably diminished. The loss of albumen is greatest where with a moderate percentage the quantity of urine is greatly increased. I have known of a loss as great as 40 grammes in the twenty-four hours, and a loss such as this, often continued for a considerable time, cannot but have ill effects on the patient's nutrition. Putting these exceptional cases aside, it may be said that it is not advisable to make a mere diminution in the amount of albumen the main object of our treatment; in other words, although some diets may lead to an increase in the albuminuria, yet they may be more beneficial to the patient than a diet under which the daily loss of albumen is slightly less. There are many reasons why the mere amount of albumen should not be taken as the main indication for treatment in chronic renal disease. In the first place, as already mentioned, the amount is not by any means an accurate criterion either of the amount or of the severity of the renal affection present, and we have seen that, except in a few instances, the actual nutritional loss is probably small. Secondly, it is very difficult to influence directly the amount of albumen either by drugs or by diet. A milk diet does not always lead to a real diminution in the daily loss, although it frequently does lead to an apparent diminution. Most of our impressions of the amount of albumen in the urine in renal disease are formed by the performance of some rough test, such as boiling the urine, or, in some instances, Eschmarch's test. Even if a twenty-four hours sample is taken, which

is not usually the case, our impressions are formed from the mere percentage estimate and the relative bulk of the precipitate to the volume of urine in the test-tube. Estimations of the total quantity of albumen lost in the twenty-four hours are rarely made except for the purposes of research. A milk diet acts as a diuretic; the quantity of urine is very often notably increased. It is obvious that a percentage reduction of albumen must occur as a result and there will be an apparent diminution, and therefore a spurious improvement, when really all that has happened will be that the quantity of urine has been increased, the daily loss of albumen remaining constant. I think sometimes that a great deal of the reputed value of milk in the treatment of albuminuria has resulted from this very obvious fallacy.

Albuminuria as such is very refractory to treatment, and neither dietetic measures nor drugs are able to produce any very obvious direct effect on the amount of albumen. This is well seen, for instance, even in the more trivial forms of albuminuria, such as physiological, functional, or so-called postural albuminuria, where it is interesting to contrast the striking difference produced on the one hand by rest and avoidance of exercise, and on the other hand the very small results seen as a sequel of restricting the diet. Again, the presence of albumen in the urine, even in large amount, is not always to be looked upon as a sign of active or progressive disease, but rather as a result of a former lesion, which, to speak crudely, may be said to have damaged the renal filter and so allow some of the proteids of the blood to pass through. We are, I am afraid, prone to look upon albuminuria, especially if marked in amount, as a sign of the presence of active, serious, and progressive renal disease; but putting on one side all cases of mere functional albuminuria, there remain a considerable number where the patient may pass quite large quantities of albumen for many years without suffering any serious inconvenience. Many such cases are often spoken of as cases of chronic parenchymatous nephritis or chronic Bright's disease, and they form a group which is one of the many reasons for the existence of much uncertainty as to the prognosis of chronic Bright's disease. These cases are frequently the sequel of some acute nephritis, or possibly sometimes the onset may have been so latent as for them to be looked

upon as cases of chronic Bright's disease. Whatever their mode of origin, there can be no question of the existence of these cases, and it is probable that in many of these we are dealing rather with the damage, permanent no doubt, but not active or progressive, inflicted by a former attack of nephritis in one or other of its forms. These patients often present but few signs apart from the albuminuria. Hyaline casts, of course, are present, but the quantity of urine is not markedly abnormal, and they have few, if any, signs of cardio-vascular changes. If the albuminuria in such a case is merely the result of a former illness, and not dependent on any progressive or active renal change, it is not very obvious why this albuminuria should be thought to require treatment, and especially dietetic treatment. The term "chronic Bright's disease," like other maladies which are called chronic, presupposes a slow, progressive, destructive change, and I cannot help thinking that many of the cases which are looked upon as cases of chronic Bright's disease of slight severity are really cases of albuminuria dependent on former damage inflicted on the kidney, and are not progressive at all. It is very undesirable that such persons should have their general strength impaired by a low diet.

Enough has been said to show that albuminuria is a most uncertain guide by which to form an opinion of the degree of damage inflicted on the kidney. Far more reliable information is to be obtained by a study of the quantity of urine and its specific gravity. Most chronic destructive lesions of the kidney lead to an increase in the quantity of urinary water, provided the lesion is not one causing dropsy; under the latter circumstances, of course, the quantity of urine is necessarily diminished.

This is a conclusion of some importance, as there is naturally a general tendency to look upon renal lesions as causing a diminution in the flow of urine, and this, doubtless, is true of acute nephritis, and of those forms of chronic Bright's disease which are accompanied by dropsy; but in a great number of chronic progressive diseases of the kidney the quantity of urine is rather increased than diminished, and this is especially seen, not only in the granular kidney, but also in one form of chronic Bright's disease, and in such affections as the cystic kidney, amyloid degeneration, etc. A

copious flow of urine, especially if it be of low specific gravity, is certainly to be regarded as a sign of the impairment of the physiological entirety of the organ. In many such kidneys the efficiency of the renal filter is very seriously impaired, and this may be a factor of great moment in treatment. Just as the quantity of urinary water gives valuable information, so also does the specific gravity, and it may be said, speaking broadly, that conclusions drawn from the study of these are perhaps more reliable in forming an opinion as to the degree of disease present than conclusions based simply and solely on the amount of albumen. Although the quantity of urine and its specific gravity afford valuable indications of the efficiency of the renal filter, a continuous, low, specific gravity being always of serious import, there are other methods available, such as the administration of methylene blue, salicylate of sodium, iodide of potassium, etc. By these drugs observations can be made as to the lapse of time between the administration and the excretion of these drugs in the urine. Speaking broadly, it will be found that the permeability of the kidney to these substances is liable to be increased in cases of so-called parenchymatous nephritis and diminished in those renal lesions where the changes in the interstitial tissue are especially marked. In some instances of contracted kidney and of granular kidney the delay in the excretion of these test substances is very considerable. Now, it is precisely in these renal lesions that uræmia is on the whole most apt to ensue, and observations of this kind are of use in indicating the principles of treatment. All forms of chronic disease do not require, perhaps, identical treatment.

It is of some interest to observe that, speaking broadly, the excretion of methylene blue and other such substances is most free in those cases where albuminuria is most marked; and it is in the renal lesions where albuminuria is not necessarily most obvious that the permeability of the renal filter is most diminished. Doubtless this is a method of observation that has not as yet been very much used except for purposes of research, but it is of value as giving indications for treatment.

The presence or absence of dropsy will very materially influence our principles of treatment in renal diseases, for several reasons. In the first place, dropsy, one of the secondary effects of cer-

tain forms of renal disease, may be directly dangerous from its mere amount, but there are other and less obvious phenomena which at any rate ought to influence our treatment. Dropsy, even in renal disease, must be associated with functional, if not with organic, changes in the vascular system; and in some cases of dropsy in renal disease well-marked organic changes correlated with the dropsy may be present in the vascular system—as, for instance, dilatation of the heart. Another, and to my mind, still more important, consideration—important because it is apt to be overlooked—lies in the fact that the dropsical transudations of Bright's disease contain very large quantities of urea and other nitrogenous extractives. It is no uncommon thing for the dropsical fluids to contain from ten to twenty times as much urea per cent. as the amount normally in the blood, and when we consider the way in which in renal disease the dropsy is generalised it will at once be obvious that very large quantities of normal urinary constituents are present in this fluid. It is, of course, possible that in addition to the normal constituents of the urine, such as urea, there may be present others that are abnormal and toxic and certainly the dropsical fluids, just in the same way as the blood of persons suffering from renal disease, are capable of exerting a profound toxic action when injected into the circulation of healthy animals. From the point of view of treatment it is essential to remember that these dropsical fluids are loaded with waste products, inasmuch as we are so much in the habit of looking upon dropsy as a condition calling for immediate measures directed to its relief. Some of the measures that we are in the habit of using for this purpose necessitate the reabsorption of the dropsical fluid into the circulation before it can be eliminated; thus we generally treat dropsy by measures directed to increasing the elimination of fluid by the skin or by the bowels, but in both instances the fluid to be eliminated reaches the skin glands or the intestine by the blood-vessels. Thus it is obvious that the dropsical fluid must pass into the circulation before it can be eliminated by these channels, and that what really happens, whether we treat dropsy by purgatives or diuretics, is that by these agents the blood is concentrated and fluid flows from the extravascular spaces into the blood-vessels to take its place. Doubtless where the dropsical fluid is

loaded with extractives the blood also contains them in large amount, so that our measures do not lead to the flow of toxic material into a normal blood; but still, on theoretical grounds it would seem preferable to remove dropsical collections if necessary by puncture, paracentesis, etc., by which means the extractives are, at any rate, removed directly and at once from the body. My point is not so much that all dropsical collections should be removed by puncture, drainage, etc., but rather that they should not necessarily in all cases be removed by purgation or diuretics. In many cases it is perhaps more advisable where the dropsical collections are not very large to leave them to be eliminated gradually, but where they are large in amount and dangerous to life on theoretical grounds it would certainly seem preferable to remove them by puncture. The great practical objection to this lies in the fact that very serious results may follow from septic infection; but still, with modern precautions it would seem that this risk might be obviated.

Although the presence of dropsy in renal disease must greatly influence our treatment, this complication is probably on the whole not more important than the presence of well-marked cardio-vascular changes, such as cardiac hypertrophy and the well-known changes in the arteries that accompany chronic renal disease. Cardiac hypertrophy, however, is not the only heart lesion that may accompany renal disease, and cardiac dilatation is sometimes of more serious import and more urgently calls for treatment than cardiac hypertrophy. It is probable that in many forms of renal disease, and especially perhaps in the granular kidney, a moderate degree of cardiac hypertrophy is on the whole beneficial. Although such patients run great risk of cerebral hæmorrhage when their blood-pressure is very excessive, yet their risks are scarcely less when, owing to the failure of cardiac hypertrophy, all the phenomena of valvular disease, such as mitral regurgitation, are produced. Excessive cardiac hypertrophy and very high tension are, of course, very dangerous; such patients are always more or less on the verge of cerebral hæmorrhage, and it may be infinitely more important to try and treat the vascular lesion and to lower the tension than to direct our treatment to the actual renal condition. Most cases of cerebral hæmorrhage occur, as is well known, either during straining as in

vomiting or at stool or else during the night when the head is apt to be low, and much may be done for these cases by advice directed to prevent such accidents. Constipation and consequent straining are especially to be avoided.

Extreme cardiac dilatation, sometimes leading even to sudden death, is not a very rare accompaniment of chronic Bright's disease, quite apart from its occurrence as a secondary phenomenon to hypertrophy. It may be seen quite early in the history of some of these cases, and is apt to reveal itself by dyspnoea and feebleness of the pulse, the underlying lesion being a degeneration of the heart.

Another factor that very materially influences our treatment is the degree of development of the cachexia and of the anæmia that accompany the more serious forms of chronic Bright's disease. It is very remarkable to notice how different cases vary in this respect. In some patients, where the state of the urine and of the cardio-vascular system both suggest that very considerable lesions are present, the general condition of the patient remains fairly good, and one may even see cases with marked albuminuric retinitis, where neither the colour of the face, nor of the mucous membranes, nor the general state of nutrition, would for a moment suggest the presence of a serious renal lesion. On the other hand, other cases are pale and cachectic-looking, and in not a few the loss of flesh and strength may be such as to rival that seen in the earlier stages of malignant disease. Such profound differences as these emphasize the necessity of taking a broad view in our treatment and not concentrating our attention on the state of the renal function. No doubt in some instances the appearance of apparent well-being, as judged by the colour of the face, is misleading, and further examination of the mucous membranes and of the blood shows that a certain degree of anæmia is present, but I think there can be no question that some of the more serious forms of chronic Bright's disease, where dropsy is absent, may be apparently in vigorous health at a time when the urine contains a large quantity of albumen and the heart shows signs of hypertrophy, the vessels show signs of thickening, and well-marked albuminuric retinitis may be present.

In some of these cases advice has only been sought owing to the sudden occurrence of a second-

dary infection, or, possibly, owing to the development of acute uræmia, and sometimes, as is well known, owing to a sudden failure of sight and the development of such a complication as retinal hæmorrhage. The presence or absence of secondary affections must to a certain extent influence our treatment, although, when these have developed, the outlook is usually extremely bad, whether we are dealing with pleurisy, pericarditis, peritonitis, or pneumonia. One of the most important reasons for sending patients with chronic renal disease abroad is, unquestionably, in order that they may avoid as far as possible the risks incident on the development of these complications.

The last accompaniment of renal disease that materially influences our treatment is the presence of uræmia in one or other of its forms. Some would look upon all cases of chronic renal disease as more or less uræmic, and this, no doubt, is to a certain extent true, especially with regard to the disturbances of the stomach and the alimentary canal; but the cachectic appearance and the loss of flesh and the anæmia are, perhaps, more accurately regarded as nutritional disturbances than as actually uræmic. Observations, both clinical and experimental, have shown conclusively that extensive destruction of the renal substance necessarily involves grave disturbance of nutrition, but is not necessarily accompanied by uræmia, and the latter condition is more accurately to be regarded as a toxic one, although the nature of the toxic agent is not definitely known.

From the point of view of treatment we may, perhaps, say that the toxic agent of uræmia must fall into one of three groups: (1) It may be a normal constituent of the urine which is retained in the body owing to a deficient excretory activity of the kidneys; (2) it may be some toxic substance that is elaborated in the body, owing to the disturbed metabolism resulting from the renal lesion; or (3) it may be such an abnormal toxic substance which finally produces its effects, owing to its retention in the system dependent on a deficient urinary elimination. Although it is at the present time impossible to state exactly what the toxic agent is, such experimental and clinical evidence as is available would seem to negative the first view, as neither clinically nor experimentally does ordinary uræmia supervene as a result of suppression of the functions of

the healthy kidneys, and therefore we are apparently compelled to accept either the second or the third view. Although uræmia cannot be definitely correlated with suppression of the urine, and although acute and even fulminating uræmia may occur at a time when considerable quantities of urine are passed, yet very frequently with the onset of uræmia the urinary flow undergoes a diminution. It must never be forgotten, however, that a part of this is dependent on the vomiting which so frequently accompanies uræmia. It is evident that in order to treat uræmia satisfactorily it is essential to know what the condition depends upon, and it would seem that at the present time we cannot go further than suppose that an abnormal toxic substance is present in the blood-stream, and that possibly, but by no means certainly, the actual onset of uræmic phenomena may be dependent on sudden diminution of the excretory activity of the kidney. Personally I am by no means convinced of the truth of the last statement, as I have seen so many cases of uræmia severe in type and fatal in issue where, even during the last few hours of life, quite considerable quantities of urine containing very moderate percentage of urea have been excreted. Further, acute uræmia occurs often in long-continued chronic disease of the kidney, where there does not seem to be any evidence post-mortem that any acute exacerbation of the renal lesion has occurred capable of leading to a marked diminution in the excretory activity of the kidney.

We will now consider shortly, having discussed the principles which should influence our treatment, some of the points in connection with the practical treatment of Bright's disease. First with reference to diet. The diet of a person suffering from chronic Bright's disease should, of course, be constructed on the principles of diminishing as far as possible the work of the kidney, always bearing in mind that whatever we do considerable quantities of urea and of salts must be excreted and that by diminishing the diet too much we only lead to the same results as those seen in starvation, namely, that the patient has to draw on the tissues of the body. A broad distinction ought to be made between the cases where, owing to the presence of the accompaniments of renal disease or owing to the severity of the renal lesion, the patient is so ill that he has to be confined to bed and the class of case where, notwithstanding

the presence of a renal lesion, possibly also severe, the general condition is such that the patient is able to be up and about or even engaged in his avocation. If dropsy or uræmia be present, in however mild a form, it is obvious that the patient must be put to bed and kept on a low diet of milk only, though doubtless it may be advisable to dilute this. Our difficulties, however, do not arise with cases of this description, but rather with those where dropsy and uræmia are absent, the cardio-vascular changes slight, the urinary changes marked, and the general condition of the patient such that he feels moderately well and probably able to be up and about and engaged in his work. Such cases should not, in my opinion, be restricted to a milk diet, however abundant, because of purely theoretical considerations as regards the influence of this on albuminuria. They should be given a diet containing a moderate amount of proteid matter, and personally I am of opinion that in selecting the proteid matter we should be guided mainly by considerations as to its digestibility rather than by theoretical considerations or even practical observations on its effects on albuminuria. Thus it is very common to order such persons moderately liberal quantities of white fish. This can only be justified from the point of view of the digestibility of the fish, since fish is relatively rich in nitrogenous extractives. If such a patient is able to keep up his strength and general nutrition on such a diet, well and good; but most persons fail to do so. Again, it would seem that there is no special virtue to be attached to what is called white meat, except that chicken, doubtless, is more easily digestible than red meat. My point is, such articles of diet as so-called white meat and fish have no special virtues as regards diminishing the work of the kidney; such virtues as they possess arise from the fact, as stated above, that they are relatively easily digestible and suitable articles of diet for most invalids or convalescents. Many observers in this country have shown that a more liberal diet, including the ordinary varieties of meat commonly eaten, may be used with great advantage in chronic Bright's disease, provided such conditions as dropsy, uræmia, etc., are absent, and provided, of course, that they are not taken in excessive amount. Many a patient with chronic Bright's disease will do better on a diet of mutton chops than on one of milk, although it is possible

that on such a diet the daily loss of albumen may be somewhat increased. In my opinion the proteid food should be limited in quantity and careful attention paid to its digestibility. It is probably advisable to forbid twice-cooked meats, and especially concentrated meats, such as ham, smoked tongue, etc., simply on the ground that the latter are necessarily far richer in proteid matter than ordinary butcher's meat. There can also be no doubt that elaborately cooked food, and tainted food, may be extremely dangerous, and it is possible even that uræmia, or at any rate grave toxic phenomena may be brought about by indiscretions in this respect. There can also be no question that meat-soups and meat-extracts of all kinds are harmful, and, personally, I am inclined to think that all stimulants are harmful, and have been unable to recognise any special virtues in the gin that is so frequently ordered. It may be advisable, where dropsy is present, to limit as far as is practicable the ingestion of water and of salts, as it would certainly seem that both may lead to an increase in the dropsy, and meat extracts may be harmful, not only from the fact that they are rich in nitrogenous extractives but also owing to the abundance of salts present.

Purgation is often of the greatest importance in the treatment of renal disease owing to the intimate relationship existing between the bowel and the kidneys. We have seen that normally the urine contains a number of substances which are elaborated in the bowel, and instead of being excreted in the fæces are reabsorbed to be excreted in the urine. Further, where the renal functions are impaired considerable quantities of nitrogenous extractives are excreted from the gastro-intestinal mucous membrane. Lastly, it is easy by the administration of suitable purgatives to materially increase the excretion of water from the alimentary canal and thus not only relieve the kidneys but also assist the treatment of dropsy. The importance of purgation in renal disease is, therefore, evident, and the only question is the choice of purgatives to produce the desired effects. Many drugs having a purgative action are unsuitable in renal disease owing to the straining that they produce, and it is certainly of the first importance to avoid all straining owing to the high tension and the diseased state of the arteries. Some purgatives are looked upon as harmful owing to the possible injurious effects they

may produce on the kidney itself, and for these reasons mercury and all its salts are withheld by some. Mercury, like other heavy metals, is, doubtless, capable of producing necrosis of the renal epithelium when given in large doses, and more especially when administered continually, and it is probable that in the past, when very large doses of mercury were used in the treatment of syphilis, mischief of this kind was done. Such an objection, however, does not apply to the use of calomel in small doses where constipation and the state of the patient's tongue are indications for its use; and the fact that it is a slight diuretic is, perhaps, rather in its favour than otherwise. The occasional administration of a small dose of calomel is, in my opinion, beneficial rather than prejudicial, but we must rely mainly on the use of salines for daily or continuous use, and it is probable that the simple salines, such as the sulphate of soda or the phosphate of soda, are more suitable than magnesium sulphate, which, although more powerful, has a considerably depressant action when used for long periods. If, for any reason, however, copious watery evacuations are desired, there are few drugs so suitable for the purpose as acid tartrate of potash, but for routine administration sulphate and phosphate of soda are perhaps most valuable.

In our treatment of the cardio-vascular accompaniments of renal disease our aim should be directed towards maintaining the blood-pressure at a moderate height, as the patient runs almost as many dangers from the failure of the circulation owing to a lowering in the blood-pressure as he does from the results of the excessive tension so often present. The high blood-pressure is not only dangerous from the point of view of the risk of cerebral hæmorrhage, but it would also seem sometimes to be associated with or predispose to the development of uræmic complications, but more frequently still a high blood-pressure causes great distress owing to the headache and sleeplessness we so often see with it. In fact, the sleeplessness of renal disease is largely dependent on high tension, and is often one of the most distressing features of the more severe cases. For the immediate relief of the more extreme high tension, and the severe headache associated with it, we must have recourse to the more slowly acting nitrites, such as nitro-glycerin or erythrol tetrol nitrate, nitrate of sodium being rarely of use owing

to the severe gastric symptoms so often seen with it. Such measures, however, are only suitable for the purpose of producing more or less immediate and temporary effects. Where the high tension is still more extreme, or the symptoms connected with it more violent, a moderate venesection is frequently of great value. But to produce more permanent effects on the tension it is probable that again we must have recourse to free purgation. The judicious administration of the saline purgatives may produce effects on the tension quite comparable to those seen even as a result of venesection, and the effects are far more lasting than those seen as a result of the administration of the nitrites. The iodides are often given for this purpose, but it is more than doubtful whether they produce in ordinary doses any very material effects. Aconite would seem to be occasionally useful, more especially, perhaps, for the headache associated with the high tension and violent action of the heart, but it is a drug that is but little used, and we want more information with regard to its action. Chloral is often of use, especially for the treatment of the sleeplessness of high tension. It produces a marked lowering of the blood-pressure mainly owing to its action on the vaso-motor system, and its dangers as a cardiac depressant are, I think, often exaggerated, and from some points of view it may be looked upon as especially indicated in the sleeplessness of high tension.

In the opposite type of case, where the tension is low on account of cardiac dilatation consequent on failing hypertrophy, treatment is difficult, inasmuch as we have to deal with a heart that is failing on account of the increased strain to which it has been subjected. Absolute rest is of course necessary, and although there may be theoretical objections to the administration of digitalis, practically, I think, much benefit is often seen from its cautious employment. The drug should be given in the form of the infusion, which is a far less toxic preparation than the tincture, and it should not be given continuously owing to its cumulative action.

Caffein is a drug which not uncommonly is useful in the cardio-vascular accompaniments of renal disease, although it is a little difficult to understand why it should be so efficacious as it sometimes is in relieving the headache associated with high tension. Many observers are unwilling to prescribe diuretics in chronic renal diseases owing to theo-

retical objections to stimulating a more or less damaged organ, but the renal lesions in Bright's disease and in the granular kidney are very often very unequally distributed and portions of the kidney may remain fairly healthy. Caffeine, however, is a drug which should only be prescribed occasionally, as when given in repeated doses it produces diametrically opposite effects to those seen with a single dose. Repeated doses may even lead, not only to a diminished urinary excretion, but even to complete suppression.

The cachexia of renal disease requires, of course, to be treated by food, and it is precisely in these cases that I think harm may be done by keeping a patient for prolonged periods on low diet. One of the most useful drugs in the treatment of this condition is arsenic, which, again, should not be given continually but periods of intermission allowed from time to time.

The treatment of uræmia is a very large subject and can only be shortly alluded to here. We may aim at getting rid of the supposed toxic agent by other channels than the kidney, as, for instance, through the skin by the bowel, or secondly we may relieve the symptoms by bleeding, or thirdly by rendering the toxic agent less active by dilution, as by transfusion; or lastly, we may attempt to neutralise its effects by the administration of such drugs as morphia, chloral, etc. I have not been impressed with the value of hot air baths in the treatment of acute uræmia; no doubt they are of value in promoting the action of the skin where this is dry in the less severe forms of uræmia, but very frequently in chronic renal disease it is impossible to make the skin sweat, and there can be no question that from time to time we see uræmic seizures of a very acute type occur when the patient is put into a hot air bath.

Pilocarpin is a drug which was much used at one time to procure sweating, and of course this can be done by giving full doses of it; but a patient under the influence of pilocarpin is in a condition of considerable distress from the salivation, lachrymation, and the effects produced on the circulation, and not uncommonly in a condition of some danger owing to the bronchorrhea produced by the drug greatly aggravating the respiratory distress that is so often present; and, as just stated, for my part I am not impressed either with the value of the hot air bath or of pilocarpin in the

treatment of acute and fulminating uræmia, and, for the reasons already adduced in this paper I look upon purging as much more suitable.

Venesection is undoubtedly of value, and very often of great value, provided an adequate quantity of blood be removed, and very striking improvement may be seen as a result of the combination of venesection and transfusion. There is not only clinical but also experimental evidence that transfusion with simple salines is very useful in prolonging life in cases of uræmia in all its forms and even in cases of latent uræmia due to calculous obstruction, where there is complete suppression, transfusion may prolong life sufficiently for surgical measures to be taken to relieve the condition. Transfusion with or without venesection is far more useful in the treatment of uræmia than it is in diabetic coma.

The use of morphia in renal disease is also a very large question, but there can be little doubt that it is sometimes very useful, more especially in the cases where epileptiform seizures are present and where there is no embarrassment of the respiration owing to dropsical or inflammatory effusions. Where the respiration, however, is so embarrassed by mechanical conditions, morphia, undoubtedly, is extremely dangerous, but the mere presence of albumen in the urine is of course not to be looked upon as a contra-indication to this drug. Some writers have used it in the treatment of the Cheyne Stokes' breathing in renal disease, but of this I have no practical experience.

*Manchester Square, W.,
February 20th, 1905.*

Surgical Treatment of Severe Forms of Constipation.—Lejars styles constipation the "ill of the century." Surgical intervention, suppressing part of the large intestine, excluding or excising it, is a comparatively simple and benign operation, when done in two operations, first curing the stercoræmia before completing the task. He adds that the large intestine, like the appendix, is an ancestral organ, ill suited for the conditions of modern life, and that it is destined to retrogress, atrophy, and finally disappear. Like the appendix, its only function is becoming more and more merely a pathologic function. Surgery, in removing these organs, merely hastens the natural progress of evolution.—*Journ. A. M. A.*, vol. xlv, No. 4.

THE PELVIC SPLEEN AS A CAUSE OF UTERINE DISPLACEMENTS.

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As a result of congenital or acquired conditions, the spleen not uncommonly leaves its sequestered position beneath the costal arch and wanders forth, especially when enlarged, into the general abdominal cavity, and may even come to lie entirely within the true pelvis. To a spleen so situated within the pelvis the term "pelvic spleen" is sometimes applied. Under such conditions it may readily be palpated either through the abdominal parietes or through the vaginal fornices. This often gives rise to the belief that an abdominal, abdomino-pelvic, or purely pelvic neoplasm is present.

When occurring in women—and many such cases are now recorded*—it is most commonly diagnosed as a uterine or ovarian tumour. Indeed, two cases are on record where this condition was diagnosed as the pregnant uterus and another in which it was regarded as an extra-uterine gestation.

Much more rarely, however, the enlarged wandering spleen when lying in the pelvis causes a retro-displacement of the uterus from direct pressure on the body of that organ, giving rise to the well-known train of symptoms of this condition.

The spleen removed from a case of this description was shown by me at the Obstetrical Society of London on February 1st, 1905. It was removed from a married woman, æt. 25 years, who was admitted into the Chelsea Hospital for Women under the care of Dr. Victor Bonney on September 18th, 1904, complaining of a more or less constant dull aching pain in the left side, in the back and in the legs. This had been present on and off for several years and had several times caused her to seek medical advice. It was, however, always considered by her doctor to be due to indigestion and flatulence.

The patient had never been pregnant, but had only been married six months. Menstruation had always been regular until the last period, which commenced on August 29th, a fortnight earlier

* Taylor, Frank E., "Two Cases in which Wandering Spleens simulated Pelvic Neoplasms," *Journ. of Obstet. and Gynæc. of the British Empire*, February, 1905.

than usual. It was very profuse and several small clots were passed. It lasted fifteen days and was accompanied by great pain, so that on the first day of the period she had to lie in bed. There was also marked constipation.

On admission into hospital a systolic bruit was heard in the region of the apex. The lungs were normal.

There was some resistance and tenderness on palpation in the left iliac fossa, otherwise abdominal examination was negative, there being neither abdominal swelling nor tumour present.

Per vaginam the cervix was felt lying low down and forwards, the uterus being retroverted, slightly tender, and somewhat enlarged. In the left lateral and anterior vaginal fornices a softish tumour about the size of a hen's egg could be felt. It was tender on pressure.

On September 20th these findings were confirmed on examination under an anæsthetic, and the swelling was diagnosed as a cystic tumour of the ovary, lying to the left and in front of the uterus, causing retroversion of this organ.

The abdomen was opened in the middle line below the umbilicus by Dr. Bonney on September 27th. The slightly enlarged spleen was found in the left side of the pelvis and in front of the body of the uterus, which was lying retroverted. The pedicle of the spleen was slightly twisted. This was transfixed by a silk ligature and the spleen was then removed. There were some adhesions round the left ovary and tube. These were broken down. The uterus was freed and lifted up into position. The right appendage appeared to be quite healthy. Recovery was rapid and uneventful and the patient left the hospital quite well on October 13th, 1904.

The removed spleen, measured along its convexity, was $6\frac{1}{2}$ in. long, and 3 in. broad. It weighed 8 ounces. Its peritoneal surface was rough and ragged from perisplenitis. The hilum was situated near one end of the spleen and was so deep that it almost completely cut off that end of the organ. Had the notch extended a little deeper, that portion would have been completely detached and would then have formed a spleniculus, or accessory spleen.

Sections of the spleen showed it to be composed of normal splenic tissue, surrounded by somewhat thickened capsule.

In this case neither the clinical history nor the

appearance of the spleen itself after removal suggests any factor of etiological significance, either as to the enlargement of the spleen, which was only moderate in amount, or as to its displacement. The perisplenitis, as evidenced by the thickened and ragged state of the capsule, was probably a secondary phenomenon which arose whilst the spleen was lying in the pelvis. It seems quite probable that the condition was a congenital one due to congenital elongation of the ligaments of the spleen.

Many years ago Mr. Bland-Sutton drew attention to this condition when he reported the following case to the Clinical Society of London: A woman, æt. 22 years, the mother of one child, had splenectomy performed in July, 1892, for axial rotation of a wandering spleen. For three years following the operation this patient reported herself and permitted examinations of her blood to be made. Nothing noteworthy, however, was detected. In 1895 she had an attack of right-sided pleurisy, and had suffered from menorrhagia; but this was satisfactorily explained by the condition of the uterus, namely, acute retro-flexion and thickened endometrium. The flexion of the uterus was caused, in the first place, by the heavy spleen tumbling on it. In 1898 she was in good health.

Dr. Clarence Webster records the case of a married Jewess, æt. 38 years, who was admitted into hospital with pain in the pelvis and lower abdomen, generally of a dull, aching character, varying in intensity and radiating occasionally to different portions of the upper abdominal and thoracic regions.

The pain was most marked in the right iliac region, where there was a swelling which varied in size and consistence from time to time, and was tender. The pain was always greatly aggravated during the menstrual periods. She also complained of frequent, and occasionally painful, micturition, shortness of breath, intense headaches, swollen feet, leucorrhœa, and occasionally bloody stools.

The swelling had been first noticed in the right iliac region seventeen years ago, after the birth of her first child. It had gradually increased in size, becoming more and more painful and sensitive to pressure.

Eight years ago she was seized with intense

agonising pain of a colicky nature, and ever since had suffered from similar attacks every two or three months. They usually lasted one or two days and necessitated the inhalation of chloroform for their relief.

Four years ago abdominal section was performed by another surgeon, who is stated to have said that the swelling was an inoperable tumour of the right kidney, and that nothing could be done for it. A few months later the abdominal cicatrix began to stretch and a ventral hernia gradually developed.

The patient had had many attacks of malaria and at 26 had typhoid fever.

Abdominal examination revealed, in addition to the ventral hernia, a prominent swelling in the right iliac region. It was firm in consistence, immobile, and tender on deep palpation. Its upper end reached to two inches above the level of the anterior superior iliac spines. Below it descended into the pelvis, where it was in close relation to the right half of a retroverted uterus.

By bimanual examination the uterus was felt to be somewhat enlarged, retroverted, and fixed. The appendages were matted together at the sides of the uterus and sensitive. The right half of the pelvis was occupied by the lower half of the iliac tumour. It was close to the retroverted uterus, with which it seemed to be connected.

At the *cœliotomy* the swelling proved to be the enlarged spleen, which was adherent to the omentum, intestines, the abdominal wall in the region of the right iliac fossa, bladder, right uterine appendage, and uterus. The vermiform appendix was thickened and buried in adhesions on the posterior surface of the spleen.

Extending from the hilum of the spleen a rope-like band passed towards the *cœliac* axis. It was the pedicle of the spleen, twisted through two to three turns.

The adhesions were separated with difficulty and much omentum was removed. The vessels in the pedicle were secured with catgut ligatures and the spleen was then removed.

The patient's condition at the close of the operation was bad, so the abdomen was filled with salt solution and closed, the separated recti being well approximated, so as to bring about a radical cure and prevent recurrence of the ventral hernia.

The diagnosis was one of the most interesting features of this case. The possibility that the

tumour might have been a pedunculated uterine fibroid, a fibroma or dermoid of the ovary, or a right hydrosalpinx was considered, we are told, but only by conjecture. As etiological factors of importance in the enlargement of the spleen the attacks of malaria and typhoid fever are to be noted.

In Plucker's case no reason can be assigned either for the enlargement or the displacement of the spleen. It related to a lady, *æt.* 23 years, who had been married five years and had had three miscarriages, but no children. For three years she had complained of pain in the stomach and back.

On vaginal examination the uterus was found to be retroflexed, slightly enlarged, and fixed. The right appendage was normal. The left ovary could not be felt, but in its place was a hardish, homogeneous tumour, without notch, the size of two fists. It was freely movable and completely filled the true pelvis.

In arriving at a diagnosis a wandering kidney was certainly excluded, but wandering spleen was considered. A consideration, however, of the anamnesis and the result of the gynecological examination led to the diagnosis of a benign tumour of the left uterine appendage, causing retroflexion of the uterus.

Laparotomy was undertaken in the Trendelenberg position. The pelvic tumour was discovered to be an enlarged spleen. Splenopexy was performed, the spleen being placed in an extra-peritoneal pouch beneath the ribs and fixed there by means of a series of silk sutures. Hysteropexy was performed at the same time. The patient made a good recovery.

Runge reports a similar case. A healthy robust-looking multipara, *æt.* 21 years, complained of swelling of the abdomen, with dragging abdominal pains, increased on movement, and dyspepsia.

In the pelvis was a somewhat elongated tumour the size of two fists, which pressed the uterus into a position of retroflexion, but which had no direct connection with the genital organs themselves.

The tumour was extremely mobile and could easily be pushed up into the epigastric region and under both left and right costal margins. When this was done the uterus was released and righted itself from its position of retroflexion. Blood examination showed no increase of leucocytes.

The diagnosis was uncertain, and lay between

wandering kidney and wandering spleen. Laparotomy was necessitated by the severe pain. The tumour was found to be an enlarged and engorged spleen with a long pedicle. This contained the tail of the pancreas, and was twisted through one turn. The omentum was also adherent to the spleen.

The removed spleen was 17.5 cm. long, 12 cm. broad, and 6 cm. thick. It weighed 850 grms. The veins at the hilus were thrombosed, though the arteries were pervious.

On section, the spleen was dark red in colour, and showed many large hæmorrhagic extravasations surrounded by splenic tissue. Besides the extravasations, there were evidences microscopically of chronic splenitis. Convalescence was interrupted by an attack of acute bronchitis, but the patient eventually completely recovered.

The above comprise all the cases which I can find scattered throughout gynæcological and surgical literature in which a displaced spleen has mechanically produced some retro-displacement—either retroflexion or retroversion—of the uterus. Klein performed the autopsy on a woman æt. 63 years, who had died from some acute pulmonary disease, in whom he found the spleen occupying the pelvis and supported by a ring pessary in the vagina. Here evidently the enlarged and displaced spleen was considered to be the body of a retro-displaced uterus, the object of the pessary being to correct the so-called retro-displacement.

Besides producing uterine retro-displacements large wandering spleens are of gynæcological interest on account of the difficulty of diagnosis to which they give rise. In fact, they usually cause mistaken diagnoses, and have at various times been considered to be uterine or ovarian tumours, tumours of the uterine appendages, hydrosalpinx, ectopic gestation, and even the pregnant uterus!

It is a curious fact that wandering spleens, like movable kidneys, occur almost exclusively in women of the child-bearing age.

Bentinck Street, W.

February 20th, 1905.

ASHMEAD presents evidence to show that the charcoal braziers used all the year around in Japanese houses are the cause of beri-beri. They generate carbon dioxide, which is the more injurious from the custom of sleeping on the floor.—*Journ. A. M. A.*, vol. xlv, No. 3.

WITH MR. EDRED CORNER AT THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET.

THE MOVABLE OR WANDERING TESTIS.

A CONDITION of the testes of children exists which illustrates many of the points I referred to in a previous lecture.* In its lesser degree the condition is well recognised, but as yet attention has never been given to the results which may be consequent upon it. It is, therefore, my intention to discuss the condition and try to bring light to bear upon its importance and pathology as far as is at present possible. The condition is one of wandering or movable testicle. It is a matter of common daily observation in a children's hospital that the testicles are capable of far more extensive movement or amplitude of translation than those of the adult. In fact, free mobility in the very young seems to be an almost normal condition. Yet the testes of some babies remain in the scrotum, and do not disappear into the inguinal regions. Until we know more, the presence of considerable movability of the testes of young children must be looked upon without anxiety, and even as physiological. But where that movement is great, the glands disappearing into the inguinal canals, it must be inferred that some abnormal conformation is present, and especially so if the child is seven years old or more. About this age the testes should be more fixed. If a deformity is initiated in a child, natural growth will subsequently accentuate and perpetuate the condition; and if the cause is removed, natural growth will tend to perpetuate the cure. If the condition of movable or wandering testicle persists, or is allowed to persist, it must be regarded as pathological and demanding attention.

A child æt. 6½ years was sent to me for the condition of imperfectly descended testes, his doctor considering that both organs were retained in the abdomen, as he had been unable to discover any traces of them. An examination revealed no sign of the testicles, nor could they be expressed from the inguinal canal. But an important point was noticed, namely, that the external abdominal rings were large and loose, as though something had

* Published in the *CLINICAL JOURNAL*, January 10th, 1905.

been accustomed to pass that way. Later attempts at examination were equally fruitless, until it was discovered that if a finger was placed over the internal abdominal ring and the ascent of the testicle by the cremasteric reflex excited by the handling prevented, both organs were found to be present and could easily reach the bottom of the scrotum. For a year the boy was watched; sometimes he apparently had no testicle, sometimes one or sometimes the other, sometimes both. In consequence of the persistence of the mobility, operation was advised, and consented to. When this was performed, it was found that on both sides the tunica vaginalis was abnormally long and large. It extended upwards from the scrotum into the inguinal canal. No communication between either tunica vaginalis and the peritoneal cavity could be found. On both sides the testes were sutured to the bottom of the scrotum (orchidopexy.) The wounds healed by first intention.

The organs were of a type associated with imperfect development and descent. The presence of the large tunica vaginalis in, and the occasional passage of the testes through, accounted for the large inguinal canals and rings present. There was no hernial protrusion present (see figure, p. 304).

Another child, *æt.* 8½ years, was admitted to St. Thomas's Hospital for undescended testicle on the left side, the diagnosis being confirmed by the presence of a large external abdominal ring on that side. The house-surgeon stated that it was the gland of the right side, and not that of the left, which was imperfectly descended. Further examination revealed the fact that both were at times fully descended and at other times not. As there was a large inguinal canal on the left side, it was decided to operate there first of all. A large tunica vaginalis was found, which did not enter the external abdominal ring at this time. The inguinal canal was full of a pad of subperitoneal fat, an inguinal lipoma, which protruded from the external abdominal ring. Above the lipoma was a small hernial sac of acquired origin. The lipoma was removed, orchidopexy performed, the hernial sac ablated and the inguinal canal sewn up. The wound healed by first intention.

In this case the presence of a "wandering" testis had led to preternatural enlargement of the inguinal canal, through which a plug of subperi-

toneal fat had been forced, and subsequently a small acquired hernial sac.

It is of interest to note that this boy was two years older than the other child, and therefore may be regarded as a further development of his condition. A third case illustrates a still more advanced degree of the malformation. A boy, *æt.* 14 years, was sent to me by Dr. Vowe Johnson for a condition of imperfectly descended testicle on each side. That on the right side was more interesting, as there was presented a well-marked hernial sac of acquired origin, exhibiting a further degree of development than in the second case. On both sides orchidopexy was done and the inguinal canals sutured, the hernial sac having been previously removed on the right.

These three cases show clearly the result of the prolonged existence, or the persistence, of the condition of movable testicle, a hernia with an acquired sac being developed in consequence of the large tunica vaginalis and movable testicle causing the growth of a large inguinal canal without the natural protective valvular formation.

The wandering or movable testicle is an interesting condition, in that there are two parts to be considered—the testis, and the tunica vaginalis.

With regard to the testis itself:—in the first case, the condition was unmistakable. The body of the testis was attached to the epididymis by a long mesorchium, a fold of the tunica vaginalis which joins these two structures together and contains the vessels, nerves, lymphatics, and vasa efferentia of the former. The body of the organ was small, and owing to the long mesorchium, was capable of considerable amplitude of movement or extension. The epididymis was imperfectly descended, not having reached the bottom of the scrotum. Whilst the long mesorchium and the small body of the testis suggested it, the position of the epididymis confirmed the fact that the organ was imperfectly descended and developed. In neither of the other cases was this condition so noticeable, possibly due to the fact that development, which should have been pre-natal, continues, perhaps more slowly, after birth.

With regard to the tunica vaginalis:—with an imperfectly descended testis, a normal-sized tunica vaginalis can dilate and so cause the external and internal abdominal rings and the inguinal canal to grow in the enlarged condition. This may have been so in the first case. But with a fully descended and normally situated testicle this could not be the case. There is a form of hydrocele, which consists of the tunica vaginalis and the patent processus vaginalis, which is completely separated at its upper end from the peritoneal

cavity, and both are distended with fluid. It is a form of hydrocele apparently little seen, though described in all text-books and called an

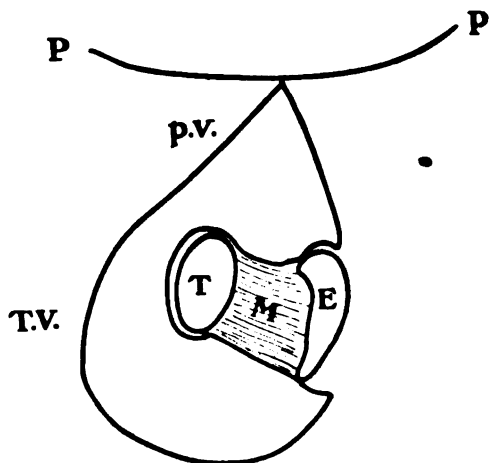


Diagram of the conditions found in Case 1. P.P., peritoneum; T.V., tunica vaginalis; P.V., processus vaginalis, in this case patent and communicating with the tunica, though shut off from the peritoneum above; T., the body of the testis; M., the long mesorchium, connecting it with the imperfectly descended epididymis.

"infantile" hydrocele. Such a condition I believe to accompany the more developed and fully descended of the movable testicles. By the presence of this infantile tunica vaginalis within it, the inguinal canal grows enlarged, loses its natural protective valvular mechanism, and causes the protrusion of a hernia of acquired origin. With the development of this hernia, the enlarged tunica vaginalis will be pushed out of the inguinal canal into the scrotum, as was seen in the second and third cases. At this stage it is impossible to gain an exact idea of the nature of the tunica vaginalis.

To sum up, the condition of movable or wandering testicle is associated frequently with imperfect development and descent of the gland, with a large tunica vaginalis frequently derived from the so-called infantile hydrocele, and an enlargement of the abdominal rings and inguinal canal which if allowed to persist will lead to the development of a hernia with an acquired sac.

With regard to treatment. In the majority of cases none is required, but the presence of the condition is a warning to closely observe its persistence over the ages of 6 or 7 (purely arbitrary), or for the development of a hernia, in both of which cases an operation should be undertaken. For the testicles, no better examples exist for the employment of the operation of orchidopexy. For the inguinal canal, it had better be opened up, a hernia looked for and dealt with if found, and the canal sutured.

SOME HEALTH RESORTS IN FRANCE.

No. V.

Châtel-Guyon.—On September 10th the bathing establishments of Châtel-Guyon were inspected by the medical visitors. The right wing of the new bathing establishment was found to be quite finished, the remainder being still in the builder's hands. A temporary stairway had been constructed connecting the old bathing establishment with the new, enabling the resources of the place to be inspected more readily. The English doctors were conducted round the baths by Dr. Sillery-Vale, who also showed them the Casino, the reading rooms, the clubs, and the cafés, not omitting the well-appointed theatre. The number of visitors to Châtel-Guyon has been estimated at about 5000 between May 15th and October 15th. The nearest railway station is Riom, twelve hours' journey from Paris. From Riom it is fifty minutes' drive in an omnibus to Châtel-Guyon, which lies about 1200 feet above the sea level. The waters are described as saline, ferruginous and magnesium, and are especially indicated in cases of chronic indigestion, constipation, and intestinal disorders. Lunch was served to the party at the Grand Hotel, and a very enjoyable concert was listened to on the beautiful terraces, where coffee was served. Late in the afternoon the party proceeded by special train to Vichy.

Vichy.—On arriving at Vichy on Saturday night, September 10th, the visitors were conducted to the Grand Hotel des Ambassadeurs. After dinner, most of the medical men went to an invitation performance at the theatre in the Casino. On Sunday, September 11th, an inspection was made of this largest bathing establishment in France, where every therapeutic appliance was shown for the treatment of stomach complaints, gouty affections, urinary troubles, and gall-stones. The waters of Vichy are all alike in that they are all bicarbonated, but otherwise the wells differ considerably, some being pure alkaline waters and others containing iron. Patients who suffer from gout are usually recommended to take the "celestin" water. Any disease due to excess of acidity is said to be benefited by the Vichy waters, and it is certainly a popular place, for 40,000 persons visit the establishment yearly. The portion of the new bathing establishment at Vichy set apart for mechano-therapeutics attracted considerable attention, and the nurses in charge of the different machines were kept very busy explaining to the doctors from all parts of the Continent the various points in the apparatus. In the evening a performance was given at the theatre in honour of the visitors.

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UTERINE FIBROIDS IN RELATION TO CONCEPTION, PREGNANCY, AND PUERPERY.

By J. BLAND-SUTTON, F.R.C.S.

It is universally admitted by writers who have devoted careful attention to the matter that the presence in the uterus of a submucous or of a large interstitial fibroid is very unfavourable to conception. A fibroid in these situations, or even in the neck of the uterus, is by no means a bar to conception or even to successful pregnancy, but such a combination is very dangerous to the mother and to the child. In this communication I propose to relate the details of four cases in relation to this question which were under my care during the past year.

CASE 1.—In April, 1904, a sterile married woman, æt. 41 years, was placed under my care on account of profuse metrorrhagia and profound anæmia, due to a cervical fibroid. The extreme anæmia made it desirable to advise the patient to submit to operation, and on April 18th I performed total hysterectomy. On looking around the pelvis preparatory to closing the incision I detected a small growth constricting the sigmoid flexure of the colon. After careful consultation, we decided that the patient was too ill to bear resection of the colon as well as hysterectomy, so that I left the growth in the colon for a subsequent operation. She recovered easily from the hysterectomy, and in the following September I excised the growth from the sigmoid flexure, and sutured the cut ends of the bowel together in the Middlesex Hospital with a successful result.

The uterus removed from this patient is shown in section in Fig. 1, and displays a fibroid in its neck; it is an example of the intra-cervical variety, and grew mainly in the posterior wall of the cervix uteri, and it has greatly displaced the cervical canal. The uterine cavity is even more distorted by a sub-

mucoous fibroid, which was probably the immediate cause of the exhausting metrorrhagia which led to the necessity for the removal of the uterus. A study of the uterus would lead one at first sight to believe that the tumour in the neck of this organ might be held responsible for the woman's non-fertility. This view will be dispelled by the consideration of the next case.

Case 2.—In August, 1904, I went to the Isle of Wight in response to a very urgent summons to see a lady in great need of surgical help.

The patient, æt. 35 years, had been married a

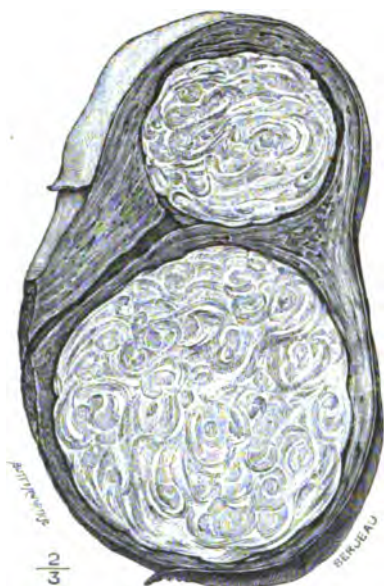


FIG. 1.—Uterus in sagittal section; its neck is occupied by a large fibroid. There is also a sub-mucous fibroid, which accounted for the very profuse bleeding which rendered operation imperative.

few years, and knew she had a fibroid in her womb. About May, 1904, she consulted an able gynæcologist in regard to the removal of this tumour because it had recently caused her some inconvenience, and was advised to wait. The subsequent course of events showed that about this time she had conceived and the pregnancy continued whilst the patient remained completely ignorant of its occurrence until August. One day whilst bathing in the sea she was suddenly seized with very acute pain in her abdomen. Dr. Hands of the Isle of Wight saw her and on careful examination satisfied himself that she was pregnant, and the free escape of blood from the vagina led him to perceive the imminence of miscarriage and the gravity of

the situation with the pelvis blocked up by an obstructing tumour. Dr. W. A. Kidd, who was spending his holiday in the island, kindly saw the case in consultation and hoped that it would be possible to have the patient removed to London, as a serious operation seemed to be necessary. Next day signs of intestinal obstruction supervened, with vomiting and acute abdominal pain.

It was late in the evening of August 13th when I reached the patient. We could make out a large rounded solid lump blocking the pelvis, a pregnant uterus displaced into the left iliac fossa, and a globular body as big as a fist in the right iliac fossa so exquisitely tender that it made the patient call out when merely lightly touched. Elsewhere the abdomen was moderately tender. The plight of the patient could only be described as grievous. The temperature was over 100° F., and the pulse beat 120 to the minute, and the pain was so great that it became necessary to administer chloroform for its relief. Though an operation was imperative, I realised its magnitude and decided to wait for daylight.

Next morning, with the assistance of Drs. Hands, W. A. Kidd, and Hollis, I performed hysterectomy. The operation was very difficult; the small intestines were loaded with fluid, and though they appeared deeply congested and suspiciously sticky in places, especially the coils which occupied the pelvis, I hoped that it was not due to peritonitis. My hopes were doomed to be falsified. During the first thirty-six hours the patient seemed to hold her own, but then the pulse quickened, vomiting supervened, and she died fifty hours after the operation, to our deep disappointment and regret.

The uterus is shown in sagittal section in Fig. 2; it contains a fetus of about the fourth month of pregnancy with the placenta and membranes. A large fibroid springs from and displaces the cervix much in the same fashion as in Case 1. This tumour, as well as the subserous fibroid also shown in the drawing, exhibited in a high degree the red degeneration which is so commonly associated with pregnancy. The uterus also contained some small fibroids. The largest tumour had an average diameter of 15 cm., although it remained confined to the true pelvis; this is instructive, because the average diameter of the true pelvis in an adult sterile woman is about 10-11 cm., but I have on several occasions carefully measured the antero-posterior

and transverse diameters of cervix fibroids and found them to be 15 cm. This excessive measurement may be due, I think, to the expansive force exhibited by the slow but irresistible growth of the tumour.

A study of the relations of the foetus and the fibroids in this specimen naturally leads one to reflect upon the probable difficulties which would arise if under somewhat less adverse circumstances pregnancy should have continued to, or near to, term. The following case supplies the answer.



FIG. 2.—A pregnant uterus deformed by fibroids; removed by abdominal hysterectomy. The average diameter of the largest fibroid was 15 cm. (6 inches).

CASE 3.—Mrs. F—, æt. 33 years, was placed under my care by Mr. L. Beer on account of an abdominal tumour complicated with pregnancy. The patient, who had been married a few months, ceased to menstruate October 27th, 1903. She considered herself to be pregnant, but her peace of mind was disturbed by a rounded tumour as big as a man's fist, which had become markedly prominent in the neighbourhood of the umbilicus. Examination satisfied me that this lump was a fibroid in the anterior wall of a gravid uterus, but the pelvis also

contained a large rounded elastic swelling, and as the cervix uteri was flattened against the pubes it caused some difficulty to determine whether the globular body in the true pelvis represented the fundus of a retroverted gravid uterus, or another fibroid incarcerated by the uterus. As there were no symptoms of urgency or interference with the urinary organs, it seemed judicious to keep the patient under observation, especially as she was anxious to have a living child. She reported herself at intervals, and the uterus rose in the abdomen, but the pelvic mass remained unaltered. On May 9th the patient came to the hospital in great pain and distress; on examination she was found to be in labour, with the arm of the foetus protruding through the mouth of the womb. Dr. Eden kindly saw the patient and decided that an operation was urgently indicated, as the pelvic tumour absolutely obstructed the transit of the foetus, and that it was dead. After the patient's abdomen had been rendered as antiseptic as the urgency of the case allowed, I exposed the uterus through a free abdominal incision and performed total hysterectomy, removing the uterus and its neck, with the tumours, foetus, placenta, ovaries, and tubes intact.

The early stages of the operation were conducted in sterilised rubber gloves until the peritoneum was sutured over the vaginal opening. I then discarded the gloves, as they had probably become contaminated by contact with the vagina, and then carefully washed out the pelvis with sterilised water, and completed the operation without gloves.

In the course of convalescence an abscess formed at the pelvic end of the incision, the result probably of a staphylococcus infection, in consequence of the hurried preparation of the skin. During the enucleation of the cervix I was a little puzzled to determine where the cervix ended and the vagina began, as the parts were soft and œdematous, but a subsequent examination of the parts showed that the whole cervix was removed. The specimen, as displayed in the drawing, shows the uterus divided in a sagittal direction; an interstitial fibroid occupies its anterior wall near the fundus; it is of the colour of mahogany, in consequence of red degeneration, which is such a common change in fibroids of the body of the uterus when complicated with pregnancy. The larger fibroid grew from the posterior aspect of the cervix, and almost

completely occupied the cavity of the true pelvis. This tumour was soft as if degenerating, and resembled in colour the peculiar yellowish appearance of wet wash-leather. It would be tedious to attempt a description of the extraordinarily contorted con-



FIG. 3.—A gravid uterus in sagittal section. The patient miscarried at the seventh month and the arm presented. Delivery being impossible on account of a large cervical fibroid, the uterus and its cervix were removed. The œdema of the presenting arm is well shown. The specimen is in the museum of the Royal College of Surgeons.

dition of the foetus, but this is faithfully displayed in Fig. 3, as well as the œdema of the presenting arm.

I have on many occasions performed subtotal hysterectomy for fibroids complicating pregnancy, and find it is an easier task than removing an

unimpregnated uterus; but this is the first occasion on which I have performed total hysterectomy upon a patient in labour. Moreover, when exhibiting the specimen at the Obstetrical Society, London (vide 'Transactions,' vol. xlv, p. 238) I was unaware of any published record or statement in which any surgeon had performed total hysterectomy (pan-hysterectomy) during labour. My friend Mr. Rutherford Morison has reported in the 'Northumberland and Durham Medical Journal,' July, 1904, a similar case, in which he successfully performed total hysterectomy for a fibroid obstructing labour. The patient had been in labour fifty-six hours. Mr. Morison's operation differed from mine in the fact that he first removed the child from the uterus (Cæsarean section) and then extirpated the uterus and its cervix; whereas in my case the uterus and its contents were removed entire. In my case the foetus was obviously dead before operation, but in Mr. Morison's patient the foetus, though living when extracted, only survived its delivery a few minutes.

It is worthy of remark that Mr. G. Grey Turner, who reported on the pathological aspect of the uterus, describes the tumour as being softened, œdematous, and exhibiting in places myxomatous degeneration.

In the patients described as Cases 2 and 3 the troubles depended on the presence of what may be called fairly large fibroids, and the difficulties produced by these tumours were manifested in the course of pregnancy, and in one case not only precipitated the labour but permanently obstructed delivery. The last case to be mentioned in this communication differs from these in the fact that it was a submucous fibroid of very moderate size which did not prevent conception nor interfere with pregnancy or delivery, but it gave much trouble during puerperium and nearly cost the patient her life.

CASE 4.—Early in 1904 a lady was duly delivered at full term of her second child. Coincidentally with the expulsion of the placenta the doctor detected a submucous sessile fibroid protruding at the widely-opened mouth of the womb. It soon disappeared within the uterus, and during the protracted lying-in it gave rise to troublesome profuse bleeding. Seven weeks later I was asked to remove the fibroid. In due course matters were

arranged. On dilating the cervical canal a sub-mucous fibroid, somewhat larger than a golf-ball, but flattened at the poles, could be localised at the fundus. The uterine tissues were extremely soft, and in endeavouring to dilate the cervical canal the largest dilator (No. 20) tore through the uterine wall at the base of the tumour. The slit was wide, the uterus soft, friable, and unsatisfactory. I explained the situation to the husband and asked permission to remove the uterus. He wisely left matters to my judgment. Without any assistance beyond that of an excellent nurse, I performed vaginal hysterectomy. The patient made a satisfactory recovery, and a year later I saw her in excellent health.

Abuse of Water Drinking in Disease.—

Manges calls attention to some facts in this connection that are not heeded as well as they might be by physicians. The normal quantity of water for a healthy adult, exclusive of the water contained in food, is about $1\frac{1}{2}$ to 2 litres a day. Only a small portion of the water ingested is absorbed by the stomach, the maximum quantity being 10 per cent. The other 90 per cent. is passed on into the intestines. Every drop of water introduced into the system must be excreted from it, directly or indirectly, by the heart; hence, the larger the quantity of liquid introduced, the greater the amount of energy demanded of the heart for its disposal. The functions which are principally affected by water-drinking are, first, metabolism; second, temperature; third, circulation, especially the heart; fourth, glandular secretions; and fifth, peristalsis. Diuresis does not depend on the quantity of water introduced into the body, but on the blood-pressure from the kidneys. When the heart is no longer competent, the daily quantity of water should be restricted to $1\frac{1}{4}$ litres, not including the water contained in food. In the earlier stages of nephritis, when good compensation exists, this restriction is advisable as a prophylactic measure. On one day in the week the patient is allowed to drink as much as he pleases. This insures the removal of any nitrogenous salts which might have accumulated. Manges' experience has proved that the results obtained from such restriction of water are decidedly better than those following the unrestricted use of water. In heart disease, the abuse of fluids is less evident, but none the less serious, in its consequences.—*Journ. A. M. A.*, vol. xlv, No. 5.

A LECTURE

ON

PRIMARY GLAUCOMA.*

By E. TREACHER COLLINS, F.R.C.S.

GENTLEMEN,—I frequently think how advantageous it would be if the names which are in use for many diseases of the eye could be forgotten, and if with our present knowledge of the pathology of these affections we could start to work and christen them again.

When first the ophthalmoscope was discovered, it would seem that any affection which was localised in the retina or choroid was regarded as inflammatory, and named accordingly a retinitis or choroiditis. We find now there are several affections of these structures so designated which have nothing to do with any inflammation. Take, for example, the disease called retinitis pigmentosa: it is a slowly progressive sclerosis of the retina extending over many years and probably secondary to changes in the capillary layer of the choroid. There is certainly nothing in it of an inflammatory nature.

What makes the name still worse is that the pigment which in many cases is such a striking feature of the disease is not essential. All the symptoms of the affection may be present without the pigment and such cases have to be spoken of as retinitis pigmentosa without pigment.

Take now an affection of the surface of the eye. The little yellow patches frequently met with in the conjunctiva opposite the palpebral aperture in those who have been exposed to wind and weather are commonly termed pingueculæ, the name being given to them because, from their yellow colour, they were thought to contain fat. Microscopically they are found to be quite free from any fat and to be mainly composed of yellow elastic tissue.

The term "glaucoma" is one which has come to have quite a different significance to that which it originally possessed and to be applied to a much wider range of cases. Originally it was applied to those cases in which blindness was seen to be accompanied by a dull green reflex from the pupil, in contradistinction to cases of cataract, where there

* Delivered at the Medical Graduates' College and Polyclinic.

was a greyish or white reflex, and cases of blindness from optic atrophy, where there was a black reflex. Now it has come practically to mean an increase of the tension of the eye. In that it does not imply some other definite pathological state it is not so objectionable as some of the other terms in use in ophthalmology. What, however, are most objectionable are the terms used as qualifying adjectives to different forms of glaucoma. Thus in all text-books on the Continent, and in some of the most widely read ones in this country, you will find that primary glaucoma is described as being acute or inflammatory and chronic or non-inflammatory.

Now, acute glaucoma is certainly accompanied by what used to be described as the cardinal symptoms of inflammation, namely redness, heat, and pain. But histological examinations of eyes suffering from acute glaucoma show no signs of cell exudation, which is an essential feature in an inflammatory condition.

The redness, heat, and pain are the result of the sudden onset of an increased interocular tension due to a blocking of the exit of the aqueous humour from the eye, and not to any irritation caused by microbial or toxic substances. The injection around the eye is due to congestion from sudden alteration of the conditions of the vascular circulation in the eye, and not to inflammation. It is better, therefore, to speak, not of inflammatory and non-inflammatory glaucoma, but of congestive and non-congestive.

The clinical pictures presented by acute and chronic glaucoma are in some respects so different that there has been a tendency among some ophthalmic surgeons to regard them as distinct affections. This, however, is certainly not the case; though some of the differences between the most acute and the most chronic are very striking, we meet with all degrees of transition between them. Moreover, we frequently find a case which commences as acute glaucoma subsequently passing on into a quiescent stage which is indistinguishable from chronic glaucoma, or a case of chronic glaucoma may suddenly get an intensification of symptoms and be converted into acute glaucoma.

The difference between them depends entirely on the rapidity with which the increase of the interocular tension comes on. If the increase of

tension comes on very slowly, the blood-vessels in and about the eye are able to adapt themselves, without any violent disturbance, to the altered condition, and no congestion or only the slightest fulness of the anterior perforating vessels is all that is seen.

If, however, the increase of tension comes on rapidly, the sudden alteration of the intra-ocular circulation results in marked venous congestion of the episcleral and conjunctival vessels, sometimes also oedema of the conjunctiva and eyelids. The amount of the congestion depends on the degree of the tension as well as the rapidity of its onset. It is most marked in what is described as fulminating glaucoma, where the increase of tension is of considerable amount and arises without any premonitory symptoms.

In many departments of medicine the *tactus eruditus*, upon which formerly diagnosis was entirely dependent, has been superseded by means which will afford more accurate information—for example, the use of the sphygmograph, or of X rays, or the performance of an exploratory operation.

In the diagnosis of glaucoma the *tactus eruditus* is still essential; though various ingenious instruments have been invented, called tonometers, for the estimation of the tension of the eye, none of them are sufficiently accurate and reliable to be of clinical use. The invention of such an instrument is greatly to be desired; for though with a moderate amount of experience it is easy to distinguish the degrees of tension which are designated as +3, +2, or +1, the increase of tension less than +1 is often very difficult to be sure about, and is frequently the cause of differences of opinion amongst even skilled observers.

A very slight increase of intra-ocular tension, barely or not at all appreciable to the touch, if kept up for a long time, may be sufficient to cause atrophy and cupping of the optic nerve. I think this is the explanation of some of those cases, which have given rise to much discussion, where there is cupping of the optic disc and contraction of the field of vision, as in glaucoma, but where no definite increase of tension is recognisable. The introduction of a delicate and accurate instrument which would record the slightest amount of increased intra-ocular tension would, I think, help to elucidate such cases.

That the diagnosis of glaucoma is still beset

with many difficulties every ophthalmic surgeon must be painfully aware. Cases frequently present themselves of acute glaucoma which have been diagnosed as some general affection due to the reflex symptoms with which it is often accompanied. Rapid failure of sight and the great pain in and about the eye should serve to distinguish such cases apart from the increase of tension.

Cases also are frequently met with of acute glaucoma which have been diagnosed as iritis, the dulness of the iris due to its being seen through a hazy cornea having been mistaken for the dulness which it presents when infiltrated in inflammation, and the external congestion mistaken for the ciliary injection of inflammation. The dusky bluish character of the former is, however, very different from the bright red colour of the latter.

The steaminess of the cornea in glaucoma has been shown to be due to oedema of the epithelium and of the anterior layers of the substantia propria, from obstruction to its circulation of lymph. It is very marked in acute glaucoma but clears up at once when the tension is lowered by operation. In the most chronic cases it is absent altogether. In chronic cases with slight exacerbations of tension and in some subacute cases it gives rise to the symptom of rainbow-coloured rings around lights, a symptom which is often a very valuable one in suggesting the presence of glaucoma. It is precisely the same condition as that which is produced by looking at gas-lamps at night through a steamy window. The cornea has frequently been termed the "window of the eye," and when the window of the eye is steamy the patient in looking through it sees the rainbow-coloured ring.

A steamy condition of the cornea from other causes than glaucoma will give rise to the same appearance, so that the seeing of rainbow colours around lights does not always mean glaucoma. In some cases of conjunctivitis this symptom is met with. Some years ago I was trying the effect on my own eye of a solution of erythrophlæine, an African arrow poison. It was stated to have local anæsthetic properties comparable to cocaine. Some hour or so after I had put it into my eye I was alarmed to find that all lights I looked at had rainbow colours around them. I hastily felt my tension, and was relieved to find that it was not increased. After a few hours the condition passed off, and I afterwards found that the

drug produced a slight haze on the surface of the cornea.

The appearance of the rainbow colours around lights, I can say from personal experience, is a very pretty one, and I can appreciate the complaint which an old lady made after an operation for glaucoma that the surgeon had taken all her beautiful rainbow colours away.

On inquiring for this symptom I think it is well generally not to put too leading a question. If a patient has seen the colours and you ask him if he has noticed anything peculiar about lights at night, he will at once know what you mean, and describe them to you.

Some years ago a gentleman came to me and said he wanted me to tell him if he had glaucoma. I tested his sight and fields of vision and found them normal. I could detect no increase of tension in his eyes. On ophthalmoscopic examination I found he had a deep cup in each optic disc, but from its appearance I was sure that it was what is known as a physiological cup, and not a glaucomatous one. I told him, therefore, that I could find no sign of glaucoma in his eyes. He then told me that two years previously he had been to an ophthalmic surgeon, who had examined him as I had done and after looking into his eyes asked him if he had ever seen rainbows. "Yes," he said, he had seen rainbows. "Well," said the ophthalmic surgeon, "you have incipient glaucoma." And he prescribed him pilocarpine drops which he had continued to use regularly since that time. He was a very intelligent man and went home and read up all about glaucoma in a medical dictionary. As the result of these studies he considerably alarmed himself and all his family. I advised him to stop the treatment, ordered him some presbyopic glasses, and he has had no trouble with his eyes since that time.

I mention this case as an example of putting a question to a patient with regard to the coloured rings in an injudicious way, and also to point out the importance of recognising the difference between the cupping of the optic disc due to a physiological peculiarity and that due to increase of tension.

In both conditions the cup has a lipped or overhanging margin round which the retinal vessels curve, but the glaucoma cup comes up to the margin of the disc and occupies its whole area,

whereas a physiological cup never occupies more than a portion of the surface of the disc.

The treatment for acute glaucoma is always iridectomy at the earliest possible moment. In some cases of acute glaucoma by the performance of an iridectomy a considerable amount of vision may be restored. I have known a case where vision had been reduced to no perception of light and where after iridectomy vision equal to $\frac{5}{6}$ was obtained. It is a point which it is difficult to determine, how long a patient with acute glaucoma may have no perception of light and yet regain vision after operation; I should think twenty-four hours of complete loss of sight would be an outside limit.

It is just about fifty years ago that Von Graefe discovered by chance that iridectomy was a remedy for glaucoma; though it was a chance discovery, it is a good example of how an accurate observation of a small clinical fact may result in an immense amount of good.

He performed an iridectomy on a case of *leucoma adherens*, in which the tension was increased, and where there was an anterior staphyloma, for the purpose of making an artificial pupil. After the operation he found the tension remained normal and the staphyloma ceased to increase. He then thought that as the iridectomy had reduced the tension in that case it might also do so in cases of primary glaucoma. But though he practised iridectomy for glaucoma for fifteen years, and was able to point out accurately the class of cases in which it was most suitable, and the best method of performing it, he was unable to explain how it acted.

It was not until clearer views were obtained as to how the aqueous humour escaped from the eye, and until numerous sections of eyes had been examined microscopically in which the operation had been successful and in which it had failed, that an explanation was possible.

Much doubtless has yet to be learnt as to the circulation of the intra-ocular fluid, but two things are quite clear: (1) that the main source of the intra-ocular fluid is the ciliary body, and (2) the main exit of fluid from the eye is at the angle of the anterior chamber.

There can be now no doubt that in primary glaucoma the immediate cause of the rise of tension is obstruction to the exit of fluid from the eye at the

angle of the anterior chamber by the displacement forwards of the root of the eye into apposition with the back of the cornea.

One way in which iridectomy for glaucoma relieves tension is by the dislodgment of the iris from this faulty position and the opening up of the normal channels of exit.

In an acute or recent case of glaucoma this is easily effected, for the iris and cornea are only in apposition, and when the former is drawn upon it readily tears through at its thinnest part where it joins the ciliary body.

In long-standing cases of glaucoma, however, this separation is not so easily effected and may be impossible. After the iris and cornea have been in apposition for some time they become adherent, and then the iris on being drawn upon, instead of tearing away at its junction with the ciliary body, tears through where it ceases to be adherent to the cornea, and a portion of it is still left in its faulty position blocking up the filtration area.

This is the reason why iridectomy for glaucoma is such a much less satisfactory procedure in glaucoma of long standing than in recent cases.

Another way in which iridectomy, or sclerotomy, may relieve tension is by the formation of what is termed a cystoid scar. A cystoid scar is a cicatrix through which there is a fistula covered by conjunctiva, forming a passage of communication from the anterior chamber to the sub-conjunctival tissue. Along this fistula any excess of aqueous humour is able to escape out of the eye. The fistula is produced by the incarceration of a fold of iris tissue between the edges of the wound which prevents them uniting. As the intra-ocular tension increases the iris lining the gap in the sclero-conical tissue stretches and atrophies, until it becomes so thin that fluid can pass through it into the sub-conjunctival tissue.

It is only in exceptional cases that anyone intentionally tries to produce a cystoid scar, because its existence is a certain source of danger to the eye. When it exists there is an adhesion between the iris and conjunctiva, and inflammation of the latter is liable to spread to the former. Cases have been recorded where a cystoid scar was present and where a purulent conjunctivitis gave rise to suppurative panophthalmitis.

The one treatment, as I have said, for acute glaucoma is iridectomy. In chronic glaucoma

there is the alternative treatment of keeping the affected eye continuously under the influence of a myotic. In certain cases of chronic glaucoma by the use of myotics the progress of the affection can be kept in check.

Thus I have a lawyer's clerk who has chronic glaucoma, and who has attended regularly every month at the hospital for the last three years. He is a man who is accustomed to doing everything with precision and regularity. Every day he puts one drop of a solution of sulphate of eserine (gr. j to 3j) and hydrochlorate of cocaine (gr. v to 3j) into each eye. His fields of vision and his central vision have been carefully watched, and have shown no signs of deterioration during all that time.

A few years ago I saw a lady, æt. 79 years, who, five and a half years previously, had had her left eye operated on for glaucoma by an ophthalmic surgeon. The next day she was told that the sight was gone, and that a second operation was required. I think there is no doubt that at the first operation the lens was wounded, for when I saw her the coloboma was filled with an opaque membrane. The right eye was also said to have glaucoma, and she had seen mists and halos with it. She was advised to use pilocarpine drops. This she did with extreme regularity, being a very precise old lady. She came to me because, for a fortnight, she had again seen halos, which she had not done all the five years she had been using the drops. I found the vision of her right eye with a correcting glass was equal to $\frac{6}{6}$ and the field full. The tension was slightly more than normal. I prescribed eserine drops (gr. j to 3j), and under their influence the halos again disappeared.

In December, 1899, I saw a lady, æt. 66 years, with glaucomatous cupping of both optic discs. Slight fulness of tension in the left eye but none in the right. Vision of the left reduced to $\frac{1}{12}$, that of the right equal to $\frac{6}{6}$ partly. Fields of vision normal. I corrected her error of refraction and ordered her eserine drops to use once a day.

She came again fourteen months later and in the meantime had been to another ophthalmic surgeon, who had advised iridectomy. As I found her fields of vision and central vision were just the same as at her previous visit, I did not consider the iridectomy necessary and advised continuance with the drops. Her third visit was four years after the

first. She had had the opinion of two more surgeons, but had still continued with the eserine and had not been operated on. Her fields of vision were still full and the only difference was that, whereas she had formerly seen $\frac{6}{6}$ partly with her left eye, she now saw only $\frac{6}{6}$ partly. Her final visit was in May last year, and she was then in precisely the same condition.

In many cases, however, of chronic glaucoma in spite of the use of eserine the tension cannot be entirely kept down, and the field of vision will gradually contract. In such cases the operation of iridectomy must necessarily be performed. In cases of chronic glaucoma the chances of success of an iridectomy, for the reasons I have already mentioned, are greatest when it is performed in an early stage of the disease—that is, before much deterioration of vision has taken place.

Unfortunately, after an iridectomy for glaucoma, due to the alteration of the curvature of the cornea from contraction of the scar, a considerable amount of astigmatism is nearly always produced. So that in order to obtain the same amount of vision which the patient had previous to operation astigmatic glasses have to be worn. Let me quote a case in point.

About eighteen months ago I operated, at an interval of some months, on the two eyes of a hairdresser, æt. 53 years, for chronic glaucoma. He had contracted fields of vision but retained in each eye central vision equal to $\frac{6}{6}$. In spite of eserine the tension remained full and the fields continued to decrease in size. The iridectomies have been quite successful in relieving the increase of tension, but now without glasses, instead of seeing $\frac{6}{6}$ with each eye, with his right eye he only sees $\frac{4}{4}$, and with his left eye $\frac{3}{6}$. With the right $\bar{c} + 1.25$ Sph., and -4.5 cy. axis 80° down and in, he still sees $\frac{6}{6}$, and the same with his left eye: $\bar{c} + 1.5$ Sph. and -6 cy. axis vertical.

Besides this difficulty, it is also important to recognise, in advising iridectomy for chronic glaucoma, that there are other risks which are unavoidable at times, however skilful and judicious the operator.

Most ophthalmic surgeons can probably recall disasters in connection with this operation. Let me relate to you one of my own.

In May, 1902, I saw a woman æt. 52 years, who after the loss of her husband, two years previously,

had noticed that her sight was failing. There were mists, she said, in front of her eye and she saw coloured rings around lamps. The left eye was worse than the right. In the left she could only see $\frac{6}{80}$, and the field of vision was smaller than the size of a threepenny-piece. With her right eye she could see $\frac{6}{12}$ with +2 D. Sph. and her field was somewhat constricted above. Both optic discs were cupped in the typical way, the left more than the right; tension on the left was +1., that of the right slightly full. I ordered her glasses and eserine drops and saw her again two months later. In spite of the regular use of the eserine the field of the right had become distinctly smaller. I then advised iridectomy on the right eye. She seemed then a sensible sort of person, though a little nervous, and agreed to the operation.

On the day fixed for the operation it was evident from her manner that she could not be relied upon to remain steady while the operation was performed under cocaine, and chloroform was administered. At the time of the operation all went well; but on recovering from the anæsthetic she became terribly excited, shouted, threw herself about, and was quite unmanageable. On the next morning when the pad was removed from the eye the lens was found to have escaped. She subsequently got some iritis and ended up with a dense membrane in the pupil.

In advising iridectomy for glaucoma it is well to warn the patient of its disadvantages. Too much must not, however, be said respecting them, otherwise the patient may become alarmed and refuse the operation, which is the only means we have of permanently arresting the disease.

A short time ago a patient came to me with chronic glaucoma who had been to two other surgeons and was therefore well up in all the *pros* and *cons* for and against operation. After hearing all I had to say on the matter, he cross-examined me as follows:

"You tell me that you cannot guarantee the operation will check the glaucoma?"

"No" I said, "I cannot guarantee it."

"You say, too, that after the operation I shall probably not see as well as I do at present?"

I said: "Without glasses you will probably not see as well as you do at present. With glasses you will probably see as well."

"Further, I understand that there is a possible risk that as the result of the operation I may lose my sight altogether?"

"I cannot deny," I said, "that there is a certain small risk."

"Well," he said, "under those circumstances I think I should prefer to continue treatment with the drops."

THE DIAGNOSIS OF CHRONIC PYLORIC ULCER AND THE INDICATIONS FOR ITS SURGICAL TREATMENT.

By W. BRUCE CLARKE, F.R.C.S.,

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THE cases to which I am going to refer to-day differ somewhat from those of gastric ulcer, which I have referred to on a previous occasion. They are characterised by more marked symptoms of pyloric obstruction, because the ulcer or its resulting cicatrix involves the pylorus, and they form a group to themselves. They are liable, too, as you will see, to be confounded with a cancer of the stomach that involves the duodenum, and it is because some of these cases are not cancer at all, and yet are incurable except by surgical operation, that I am bringing them under your notice to-day.

I will begin by reading you short notes of the cases on which I propose to comment and then proceed to discuss the important points in their diagnosis and treatment *seriatim*.

E. W—, æt. 59 years, had suffered from severe attacks of indigestion for some years. He seemed to have no exact recollection of when these attacks started, but there was no doubt in his mind that in April or May, 1903, he had been seized with a specially severe attack and it was from this period that he dated the commencement of his present illness. At that time he was seized with an attack of severe pain that came on after food, and lasted for about an hour, and he suffered severely from constipation, finding considerable difficulty in getting his bowels moved more often than every three or four days. After a while he felt better and began to resume his work as a fitter, but he never felt quite himself after this attack which I have just referred to.

In December, 1903, his pain returned, and was so severe that he was unable to go on with his work. He states that he vomited everything he took.

On January 9th, 1904, he was admitted under my care, with what appeared at first to be an attack of chronic intestinal obstruction. He was at that time a good deal blown up with wind, and his bowels had not been open for a week. He was put to bed and several large enemata consisting of soap and water and turpentine were administered

with satisfactory results. By January 13th, four days after admission, he was able to take solid food in small quantities. His condition was so much improved by the treatment to which he was submitted that on January 27th he left the hospital with the intention of resuming his work.

During his stay in the hospital he was, it is needless to point out, examined on many occasions. I myself went over his abdomen several times, but could never satisfy myself that there was any physical condition that demanded operative treatment, and I regarded the case as one of chronic fæcal accumulation dependent on indigestion, and one of my medical colleagues saw him as well and came to the same conclusion. There was, you will observe, during the whole of his stay in hospital no hæmatemesis or melæna, and no other symptom of gastric or duodenal ulcer which I thought called for operation. So far as we could ascertain he had up to this time never suffered from either hæmatemesis or melæna.

Before he had been out of the hospital a week his symptoms returned, and he states that he was worse than ever. On March 22nd he applied for readmission, and when he was examined in the surgery at this time a lump was felt for the first time in his abdomen. It was situated just below the liver, and it was this lump which, together with his other symptoms, determined his readmission.

The change which had taken place during the two months that had elapsed since his discharge from the hospital was very marked. He had lost flesh considerably, and was thin and emaciated, and he had an haggard appearance. When he came into the ward no tumour could be felt, but his abdomen was tender all over. There was some resistance and excess of tenderness behind the right rectus muscle above the umbilicus. A day later the swelling that had been felt in the surgery was again apparent, and it seemed highly probable that this was connected with his pylorus, and was the cause of his trouble.

He was kept in bed for about a fortnight, during which time his condition much improved. His vomit, which was offensive, grew less so under repeated washing out and his bowels acted with fair regularity after medicine. He could only take fluid diet.

The diagnosis of cancer of the stomach seemed highly probable and he was submitted to operation.

An incision was made slightly to the right of the middle line in the epigastric region. The growth presented in the wound, and was found to involve the pylorus. No enlarged glands were visible either along the lesser curvature of the stomach or towards the liver. A clamp was placed on the duodenum, which was severed about half an inch beyond the limits of the growth. The stomach was also cut across about three inches from the pylorus. The upper part of the stomach wound was closed, the mucous membrane being united with catgut and the peritoneal and muscular coats for the same distance with a continuous silk suture. Thus an opening in the stomach and duodenum, each practically of the same size, remained, and these were united by end to end suture in a similar manner. The abdomen was closed in the usual manner. The patient made an uninterrupted good recovery and went to Swanley Convalescent Home on May 5th, just one month from the day of his operation.

The next case to which I will refer is that of a man who was under my care some time back in consequence of well-marked cancer of the stomach, which was obvious from the moment that he came under my care. A postman by occupation, æt. 47 years, he had been in good health until three months before I saw him, when he began to suffer from severe pain after food. Vomiting soon followed, and when I saw him for the first time he weighed only just 10 stone, and stated he had lost 4 stone in weight in three months. A very distinct mass could be felt in the region of the pylorus. He had vomited considerable quantities of altered blood at times, and the contents of his stomach were foul and putrid. He was put to bed, and his stomach washed out at first two or three times daily. Under this treatment he began rapidly to improve, and was able to take liquid food, but suffered considerable pain every time that food passed into his stomach. He was very desirous of undergoing some operation for his relief, and after it had been duly explained to him that an operation was unlikely to afford him more than temporary relief, and he had again expressed his willingness to submit to it, I opened the abdomen just as I did in the previous case, and came down at once upon a mass of growth in the situation above indicated. It was already beginning to invade the surrounding parts, and there were some enlarged glands in its

immediate neighbourhood. Its complete removal would have been impossible. A retro-colic gastro-jejuno-stomy seemed to afford the only chance of giving him relief, and it was accordingly performed by the method which I described to you in my last lecture. The patient made a good recovery and left the hospital much relieved and able to take a small amount of solid food. His pain had almost entirely disappeared. Three months later he returned, his abdomen half full of fluid, presumably from pressure on the portal vein by further extension of the growth. He did not complain of pain, and appeared able to take easily digestible food without much difficulty. I have not been able to discover the further history of his case, but there can be no doubt that the progress of the disease must have terminated his existence soon after I saw him for the last time.

Let me refer to another case in which the disease was undoubtedly innocent and inflammatory in character.

Quite recently I have had under my care a man, *æt.* 54 years, who has suffered for several years with symptoms of very severe indigestion. His illness apparently began some seven or eight years ago. At any rate, that was the first occasion on which he consulted a doctor for it. He was at that time suffering from severe pains in the stomach after food, and usually vomited after each meal. He appears to have been under treatment off and on almost ever since and has been taught to wash out his stomach. He has washed it out whenever he felt any tendency to sickness and by this means appears to have kept himself fairly comfortable, though he has not been strong enough to do a good day's work for some time. He does not appear to be very thin or emaciated, but is quite unable to take food of any kind unless it is finely pulverised, pounded, or passed through a sieve. His vomit consists of semi-digested food, and he suffers greatly from constipation.

His abdomen was carefully examined and no abnormal condition could be discovered except that some tenderness was elicited by pressure on the epigastrium.

His stomach was filled with gas by the administration of the two halves of a seidlitz powder separately. Though some discomfort was elicited by this procedure, no acute pain was produced nor did the stomach appear to be of unusual size. If

you are anxious to avoid as far as possible discomfort, and not to run the risk of your patient vomiting when you adopt this method of diagnosis, it is important that you should administer the seidlitz powder when the stomach is empty. My rule is not to employ dilatation with carbonic acid unless six hours have elapsed since the last food was taken. Unless you adopt this precaution, you will find that your patient is liable to vomit, and he will not be anxious to permit you to repeat this method of diagnosis if you desire it.

This patient's abdomen was opened slightly to the right of the middle line in the epigastric region, and the pylorus was explored with the finger. The stomach was somewhat drawn up, and the liver firmly bound down to the surrounding parts. A distinct hardening could be felt in the region of the pylorus, and it was quite impossible to invert any portion of the stomach wall through the pyloric orifice with the finger. A gastro-jejuno-stomy was therefore performed by the retro-colic route, and the two loops of jejunum likewise united by the plan which I have already detailed to you in a previous lecture, so as to prevent any possibility of the occurrence of the vicious circle which I also referred to on the same occasion. The patient made an excellent recovery, and was able before he left the hospital to take solid food with ease. He said he never felt better in his life.

Let me begin my remarks on these three cases by stating that I do not believe it is possible in a great number of patients to distinguish between an innocent and malignant growth of the pylorus until an exploration of the abdomen has been made. For that very reason it is, I think, highly desirable that where doubt exists explorations should be made early in the disease. Unless that is done, there is in malignant disease but little chance of effecting a permanent cure or even of giving the patient a long respite from recurrence. It may, perhaps, be questioned whether one has at the present time any right to talk of permanent cure. Very few cases in which a radical operation has been performed have survived two years. On the other hand, Kronlein has recorded one that survived eight years and another four, neither of whom had at that time any signs of recurrence. Both of these cases have well passed the three years' limit, and in both of them, therefore, there

is some justification for speaking of permanent cure.

In all cases be sure to get as accurate a history of the onset and progress of the disease as you can. It is always of great value. It is rare in malignant disease to get a long history of gastric trouble before the patient applies for treatment. As a rule he will tell you that his symptoms have only been noticed a few weeks. He has probably been a robust, healthy man up to the time that he was seized with an aggravated attack of indigestion, in which pain after food formed a prominent feature. Perhaps he will tell you that it was accompanied by a sensation of heaviness, drowsiness, an inordinate sense of repletion which came on after very little food had been swallowed. It may be possible that his appetite has suffered considerable diminution, and he has been obliged to exercise much caution recently in the choice of his food, if he wished to retain it at all.

If you recall the symptoms that were presented by the postman whose case I have just related, you will be struck, I think, with the rapidity with which his symptoms asserted themselves. In three months from their onset he had lost 4 stone in weight, was quite unable to do his work, and vomiting was a prominent symptom. The nature of the vomit was characteristic; it was of that peculiar type which we call coffee-ground, a term sufficiently expressive, and had, moreover, a foul-smelling odour.

I am referring to this case first because I am anxious that you should get in your head first of all the typical symptoms of cancer. By this means you will be enabled more easily to distinguish the symptoms which characterise a pyloric ulcer of a simple nature from one that is malignant.

In this case there was hardly a possibility of the disease being anything else but malignant. Many patients do not, however, present such obvious symptoms, and it is well that you should realise that this is so. Occasionally cancer of the stomach runs its course almost without symptoms of any kind—at all events, without any which can be referred to the organ in question. I have the notes of a case of this nature which I took when I was a house-physician to Dr. Andrew, which puzzled, I believe, everyone who saw the patient. He was an elderly man, who stated that he had been in good health until a few months before his admission. His chief

complaint was of severe pains in the back, which were induced, or at any rate much aggravated, by certain movements of his body. He could always bring them on by turning round sharply and bringing into action the rotator muscles of his spine. He suffered severely from constipation, and passed a good deal of uric acid gravel with his water. His symptoms were relieved by purgation, dieting, and rest in bed. For a long time his condition was supposed to be due to that fashionable disease suppressed gout, and that was believed to be the sum total of his ailments. Though he suffered from nausea, coupled with a distaste for all kinds of food, he never vomited until a few days before his death, which occurred somewhat suddenly from peritonitis. It was not till his post mortem revealed a cancerous ulcer on the back wall of his stomach, which had perforated and given rise to the attack of peritonitis in question, that the true nature of his malady was made out. In this case, however, there was no growth in the neighbourhood of the pylorus at all, and it was this circumstance probably which gave rise to that entire absence of the symptoms which are generally so indicative of carcinoma. You will usually find that the pain is worse when the growth involves the pyloric region early, whether that growth is innocent or malignant in character. It would seem to be the passage of the food over the ulcerating surface, when it is being forced by the contractions of the stomach into the duodenum, that gives rise to the violent pain that is complained of so often by these patients.

The character of the vomit should always be carefully noted. It is often said that there are three kinds of vomit that need to be distinguished in these cases—fæcal, foetid, and fermenting. The first variety is, as you know, pathognomonic of obstruction; the second is often stated to be quite characteristic of cancer. This statement, though generally correct, is not absolutely so. Vomit which presents an odour of fermentation is an indication that the food has remained longer than it should do in the stomach; in other words, it is an evidence of some obstruction, which prevents the food from reaching the duodenum with due rapidity. Coffee-ground vomit depends on the presence of blood for its characteristic appearance. It is very often foetid as well. The typical vomit of cancer, like the typical cancerous cachexia,

manifests itself far too late in the course of the disease to be of much service to the surgeon, whose desire should always be to attack it early, for then alone can he attack it with success.

Osler, whose researches into this disease are well known, states that in cancer of the body of the stomach vomiting is not usually an early symptom, but that when the passage of food through the pylorus is materially interfered with dilatation necessarily ensues, and may be present to such an extent that the stomach almost completely fills the abdomen, and may even encroach upon the pelvis.

A dilated stomach, under these conditions, is always a serious symptom, and if it does not yield to medical measures can be much relieved by surgical interference. Do not confound the idiopathic dilatation which may accompany severe indigestion with the dilatation that is caused by true obstruction. Idiopathic dilatation rarely, if ever, demands operation.

In all doubtful cases the supra-clavicular glands should be sought for to see if they are enlarged. The occurrence of secondary glands in this situation is a strong point in favour of malignant disease. An examination of stomach contents should always be made with a view to ascertaining if there is a diminution in the amount of free hydrochloric acid; lactic acid and certain bacilli are often found when cancer is present. These conditions, therefore, serve as a help in distinguishing malignant from innocent disease of the stomach. In order to determine the presence of lactic acid what is called a test meal must be given, from which, of course, this acid must be rigidly excluded. The stomach is carefully washed out by the method which I have already explained to you, and the washing out is repeated until the fluid returns perfectly clear. A meal consisting of oatmeal and water is then administered.

There is a special form of bacillus called *fili-formis* which grows well on agar, and if its presence is revealed in cultures taken for the purpose another point in favour of cancer is scored.

Unfortunately, these distinguishing signs are often not present in an early stage of the disease, so that I am sure you will realise how great are the difficulties in deciding on appropriate surgical treatment in those cases in which cancer is suspected. Another marked feature which you will note in connection with cancer of the pylorus, and which

this case brings out very forcibly, is the immediate and enduring relief that follows gastro-jejunostomy.

Perhaps you will think that I am dwelling unduly on the symptoms of cancerous disease, when my object is to direct your attention rather to the serious consequences of chronic pyloric inflammation, but I have already explained to you my reason for so doing.

You will remember that I have laid stress on the duration of the symptoms as a means of helping us to distinguish malignant from innocent cases. Let me recall your attention to the notes of E. W.—'s case, the first one which I referred to when I began my lecture. I pointed out to you that he had suffered from indigestion of a severe type for many years, but that his severer symptoms had only supervened quite recently. When I removed the growth in question, I had little doubt that the case was one of cancer, and so indeed it was, but the microscopic appearances of cancer were present only in one small portion of the mass that I removed. Ulceration had taken place close by the pylorus, and there was a considerable mass of thickening round it, but there was no trace of cancer growth except on part of the ulcerated patch. The cancer belonged to that variety which we call columnar-celled. The remainder of the thickened mass was carefully re-examined, but no trace of cancer infiltration could be discovered in it; it was purely inflammatory.

There can, I think, be but little doubt that the thickened mass to which I have just alluded was due to a long-standing pathological change which was dependent on a pyloric ulcer that had become cicatrised. If this is a correct view to take of the case, his long-standing digestive trouble is easily explained.

The cancerous patch was obviously a recent growth that had selected a piece of damaged tissue in the immediate neighbourhood of the pylorus for a starting-point, and it was this small ulcer to which the later and more severe symptoms which lead on to emaciation were to be attributed. Let me pause a minute to explain to you how it was that a small patch of malignant growth which was not larger than a sixpence, perhaps hardly as large, could bring about all this difference in the patient's condition. This growth, bear in mind, was situated close to the pylorus, and the pylorus under ordinary circumstances plays the part of a

sphincter to the stomach, and contracts or dilates in obedience to the dictates of the digestive process. If there is an ulcer in its immediate neighbourhood, the process of dilatation becomes a disagreeable one, and pain is caused which is sufficient to prevent complete dilatation, and the onward passage of the food which the stomach has partially digested is barred. Vomiting, dilatation of the stomach, and general emaciation follow in due course. An exact analogy is to be found in what takes place in connection with the presence of an anal fissure or ulcer. The only difference is this: The anus is situated on the outside of the body, and we can see and feel what is taking place there: the stomach lies inside the abdomen, and its pathological processes must generally be inferred, as it can only be inspected at rare intervals. So much for the cause of the emaciation.

The emaciation itself was by no means an un-mixed evil, for I have little doubt that it was this emaciation which had taken place after he left the hospital for the first time that enabled us to feel the hard mass when he presented himself on the second occasion.

If I am correct in the view which I take of the case, there is every chance of a prolonged period before recurrence takes place, possibly of a radical cure. I am taking steps to keep this man under observation, from time to time, so that you will have an opportunity of tracing the future history of the case.

The third case to which I have referred is typical of chronic ulceration, and belongs to a type in which the results of surgical interference appear to be eminently satisfactory. You will note that he had suffered from gastric symptoms for some years, and had undergone an extensive course of medical treatment. He had been rested in bed, dieted, and had had his stomach washed out regularly for a considerable period, but no permanent good had resulted from this treatment. He got better, it is true, but his improvement was only temporary, and persisted only so long as he was dieted, and great care was taken only to introduce into his stomach such food as could be easily digested. Even such treatment was not attended by complete success; for his pains returned, though with much less frequency than when ordinary diet was resorted to. The bulk of his food, I should imagine, was able to pass his pylorus, if great care was taken to mince

and pulverise it before it was swallowed, but anything like gristle, or hard pieces of crust, seemed at once to bring on his pains with considerable severity, and they were not relieved until he vomited or washed the offending substance out of his stomach. He resorted to this process of washing out whenever he felt his pains coming on, and by this means managed to lead a fairly comfortable life, but it was the life of an invalid, and not that of a healthy man, and he never felt able to do a good day's work.

It is instructive to note the condition that was discovered when his abdomen was opened, for you will remember that practically no physical signs were present to indicate what was likely to be discovered beforehand. The stomach was attached by adhesions to the surrounding parts, and this was especially the case in the neighbourhood of the pylorus, where some thickening could be detected, but only when the finger had access to its immediate vicinity. The liver was firmly bound down by adhesions to the pylorus and its neighbourhood. This condition, of course, points to old ulceration, in which gastritis had given rise to perigastritis, and is one in which but for the adhesions in all probability perforation must have taken place. The relief afforded by the gastro-jejunostomy was immediate, and no untoward symptom occurred to interfere with the course of his convalescence.

I am unable to speak to you with that certainty of the indications for operation in these cases that I should like to. We are only on the threshold of what bids fair to be a new development of surgery. But when the surgeon feels confident of being able to treat such cases with safety and success, there is, it seems to me, every reason why he should make the attempt, especially when all the resources of the medical art have been already tried and failed to give permanent relief. What we now require is to watch the after results of this surgical treatment, so that we may promise with confidence that its results will be permanent.

Nothing is so remarkable in the history of surgical progress as the way in which one disease after another that seemed to be rare is proved by surgical interference to be quite the contrary; and the reason of this, if we reflect on it, is not far to seek. Chronic invalids are usually credited with having acquired or inherited a vicious constitution. We describe them as neurotic, because that condi-

tion is superadded to their many ailments, real and fancied. But the prime cause of their condition is in many cases a real pathological entity, and when it is discovered it is capable of removal with as much ease and success as we remove a stone from the bladder, or a loose cartilage from the knee-joint.

The cases which I have related to you to-day owe most of their symptoms to the fact that the food was unable to pass with normal freedom and ease through the pylorus. Whether this condition is due to cancer or not, a greater strain is put upon the stomach walls, and the food, if it is to find its way into the intestines at all, must be forced over an ulcerated surface. This condition has been well known, readily recognised, and in many cases successfully treated, for years, but there is a residue of cases in which the diseased condition only runs from bad to worse. Fresh inflammation is induced and the surrounding parts are invaded with the result that adhesions to and inflammation and thickening of neighbouring structures occurs. These neighbouring parts are in their turn crippled and thus the original symptoms are tenfold aggravated.

It is to arrest this condition that surgical interference is called for, and it is, I confess, astonishing to me how thoroughly the effects of long-standing ulceration can be removed, and how complete the relief that is afforded. There cannot be a doubt that such operative interference is based on sound reasoning.

The next step is to determine what limits are to be placed on our interference and what rules are to be laid down for our guidance. It is only by careful observation of such cases and by closely following up their results that we can hope to attain to this end, and that is my excuse for bringing these cases under your notice to-day.

Nitroglycerine in Surgery.—Elvy calls attention to the value of nitroglycerine in surgical cases, administered in doses of gr. 1 in 100. He advises its use in incipient senile gangrene and in all cases of impaired circulation in which contracted arterial walls are present. Even when the arteries seemed to be normal he has used the drug with benefit in local congestion.—*Journ. A.M.A.*, vol. xlv, No. 5.

SOME HEALTH RESORTS IN FRANCE.

No. VI.

Bourbon l'Archambault.—On September 12th the party of medical men visited the bathing establishment at Bourbon l'Archambault, which is near Moulins and close to Souveyney station on the Orleans railway, 212 miles from Paris. This bathing establishment has been lately rebuilt by the French Government and is an exceedingly handsome edifice. The French Government have also here a large military hospital where excellent results are obtained in the treatment of rheumatism, nervous affections, and scrofulous conditions. The waters are described as from salt and iron springs, and good results are obtained in the treatment of joint troubles, of atonic gout in the feeble, and in gouty diabetics with nervous depression and lowered vitality. This bathing-place has many historical associations stretching back to the Roman occupation, and is pleasantly situated between four steep hills about 900 feet above the sea. The cost of treatment is not expensive, and good board and lodging can be obtained for from five to eight francs per day. The success of this resort is a good example of how well the French Government understand how to run institutions combining utility with pleasure.

Bourbon-Lancy.—The well-known bathing establishment of Bourbon-Lancy was inspected by the medical visitors on September 13th; it lies nearly 800 feet above the sea and is about eight and a half hours' railway journey from Paris. There are six springs affording saline ferruginous waters. The season lasts from May to October, and the special indications for medicinal treatment are said to be in gouty and rheumatic cases, the waters promoting renal elimination. The doctors practising at Bourbon-Lancy claim that excellent results have been obtained in cardiac cases by means of what they call "submarine douches," combined with the internal use of the waters and general treatment. The submarine douches consist of douches applied beneath the surface of the water. There is a well-appointed hall for mechano-therapeutics with apartments for massage and Swedish gymnastics. A large swimming-bath forms a great attraction; it is fed by the overflow of the springs, and the water is thus continually being changed. The aqueducts connected with this bath were constructed by the Romans.

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A CLINICAL LECTURE

ON

SOME CASES OF HÆMATEMESIS.

Delivered at St. Bartholomew's Hospital.

By NORMAN MOORE, M.D., F.R.C.P.,
Physician to the Hospital.

GENTLEMEN,—I think that in clinical lectures one should, more or less, keep to the actual discussion of conditions which we see in the wards, and of which we want a clinical explanation. I mean by that that I, at any rate, prefer to discuss in clinical lectures the subjects which are before us in the wards as elucidating the several questions we have to answer at the bedside. To-day I thought of lecturing on some cases which we have had lately, three cases of vomiting of blood—hæmatemesis. Now, that is of course a very startling and obvious symptom. First of all, it is a symptom which there is, as a rule, no doubt about. You may sometimes be in doubt whether a patient has a particular nervous affection or not, or a nervous symptom. For instance, one is frequently a little uncertain whether there is nystagmus in a particular patient, and you are obliged to come to the conclusion that if there is it is very slight, though it may be present. But with regard to vomiting of blood, there very seldom indeed is any doubt whatever about the symptom. Still, it is a sort of traditional way of looking at it, and it is one which I think we always follow in the wards, of first of all deciding whether the blood really has been vomited or not. And it is a most important point, because of course blood may sometimes appear to have been vomited which has not really been so. I mentioned in the wards, and I may refer again here, to an example and a very important illustration of this in a man who habitually drank a great deal, and therefore was exposed to one of the conditions which precede the vomiting of blood. No man, judging from his habits, could

have been more likely to have cirrhosis of the liver than this particular man, and he was already fairly advanced in life, and appeared to drink more brandy the older he grew. One day he was supposed to vomit a very large quantity of blood. He lived in the country, a little distance from London, and the blood was kept to show. We have always to decide first whether the blood has been vomited. His medical attendant, who saw him, who was well acquainted with his habits, not unnaturally thought when he saw the blood that there at last was the proof that he had cirrhosis of the liver and Sir William Jenner was asked to come down from London to see him. He saw him. Sir William Jenner was a physician of the most perfect clinical kind; I mean he was an admirable clinical observer. He never took anything for granted; he always tried to ascertain for himself whether any particular symptom was present, and what groups of symptoms were present. Sir William Jenner looked at the man carefully, and before proceeding to examine his abdomen he looked at his mouth and his tongue. And there he perceived that a gold tooth-plate had divided a branch of the tonsillar artery, and was then actually very near it. Part of the plate had become torn off and was sticking into the tonsil. He arrived at the conclusion that the blood came, not from the stomach, but from the tonsillar artery. The wound was dressed and treated, the bleeding ceased, and the man lived for many years after it. I myself saw him once several years after this event, and he never did suffer from cirrhosis of the liver, and eventually he died of something very different, at an advanced age. Here, then, was an example of the importance of the first observations with regard to hæmatemesis. There is the blood. Was it vomited? Was it a true hæmatemesis? Well, if you have been present and seen it come up you will take the precaution which Jenner did, and you will carefully look at the back of the mouth. It is not very likely you will come across such a case, but it is a kind of which there might be a considerable number collected, because tooth-plates not infrequently inflict wounds on the mouth and œsophagus. There are specimens of such injuries in many museums. But if you have the blood before you, can you tell from looking at it whether it has come from the stomach? Of course there are well-known tests whether it has clotted or not

and its colour; if it is clotted and is dark in colour and mixed with food it has come from the alimentary canal; if it is bright red and mixed with air, then it has come from the lungs. Does it give an acid reaction with test-paper, or an alkaline reaction? If it is acid, it is probably mixed with gastric juice; if it is alkaline, it is probably from the lungs, and is nearly pure blood. Those points you have first of all to consider if you have the material vomited before you. But in a great many cases of hæmatemesis you have not got the vomit before you; you have nothing to go by but the history.

And now I will proceed to tell you the history of the cases in the wards, because very often in making a diagnosis you have to judge from what is told you, not from what you really see. In fact, hæmatemesis has often taken place and the blood been thrown away before you see the patient. One of these cases was that of a woman aged 35 years, in John Ward, and this was her history: On April 19th she vomited three times, bringing up more than a pint of blood, so she and her friends said. On Wednesday, the 20th, she vomited again, bringing up one pint and a half of blood. Here is a point which I should like to draw your attention to which otherwise might escape you until you had considerable experience of these cases. On that day a menstrual period began. Now, that is a point of some little importance in relation to the diagnosis of the cause of hæmatemesis. Menstruation began, but was comparatively scanty, and only lasted for a short time. On Thursday, the 21st, she vomited and again brought up some blood, amount unknown. On Friday, the 22nd, she again vomited and brought up half a pint of blood and on the 23rd another half-pint of blood, and on each occasion after the vomiting she fainted. She had a slight pain in her abdomen on one of the days, the 22nd. She did not come in till the 24th, and this is the history which we obtained of what took place before her admission. So that on five successive days she vomited blood, and a considerable quantity of it. On the second of these days her menstrual period came on and it only lasted for a day. On one day only she had pain in her abdomen. That was the history of this particular hæmatemesis. Now I will state the history of her previous condition. She had had winter cough for twenty years, but never had

hæmatemesis before this attack. It was stated that she was a heavy drinker, and her husband, who is dead, was stated to have drunk heavily also, indicating that the household was given to alcoholic excess. That is the history. And the first point that would occur to you would be, was it true? Was it true that she had vomited all this blood? As a rule I advise you not to doubt the statements of patients. Patients generally mean to express the truth to you. Of course if a patient says he has vomited three quarts of blood you will doubt whether the quantity was as great as that. But you will interpret his statement as meaning that he vomited a large quantity of blood. So I have no reason to doubt those statements. But the woman's appearance, which was one of extreme pallor, with a very feeble pulse, left one no doubt whatever that the account was true, and that she had on successive days vomited a very large quantity of blood, and that it had a definite effect upon her appearance and upon her circulation.

I will now just relate to you what happened. We examined her chest, of course, and found it to be perfectly natural, and we did not find any tumour or anything else which was noteworthy in her abdomen. What was remarkable about her was her pallor, the signs of her having lost a great quantity of blood. When her bowels acted the stool was black; it obviously contained altered blood. We fed her by the rectum. She had no dropsy, no ascites of any kind, and in course of time, rather more than a fortnight, she obviously was better. She had no further hæmorrhage; she could be fed by the mouth. She was admitted, you will remember, on April 24th and on May 24th she had been able to get up for some days, and on June 8th she left the hospital. There, you see, was a well-marked case of hæmatemesis, and the question at once arose as to what was the cause of it. Now I will discuss each of these separately, and then I will say a few words about them taken together.

Taking them separately first, what was the cause of the hæmatemesis in this case? She brought up a large quantity of blood. She had no history pointing particularly to her stomach; she had not complained of pain except on one of the days, and then she had slight abdominal pain. There was a history that she drank to excess. What was the cause of her hæmatemesis? Now, in deciding a

question like that, as to what is the cause of a common symptom, I should advise you to always keep your minds in this frame, to say to yourselves, "What is the commonest cause? What cause has most often been found to account for it?" That which has occurred most often in the past is most likely to occur in the future. Therefore until you have satisfied yourself that the common causes are not present do not think of remote causes, do not draw up a long list of every possible cause of hæmatemesis; think of the commonest causes of hæmatemesis in persons aged 35 years. There are only two common causes of hæmatemesis in the patients of that age seen here. One of them is cirrhosis of the liver, and the other is gastric ulcer. So that the first question to put to yourself is this, "Is the case one of gastric ulcer, or is it one of cirrhosis of the liver?" It is a most difficult question to answer. In this particular case I myself was not able to come immediately to a positive decision. The decision obviously affects the treatment. If a patient has had a large hæmorrhage due to cirrhosis of the liver, and if the blood has been got out of the stomach, there is no reason why you should not feed the patient by the stomach and try to restore the amount of blood-tissue which has been destroyed as quickly as possible, because it is purely capillary hæmorrhage. However large the hæmorrhage in a case of cirrhosis of the liver, say in a fatal case—because every now and then it is fatal—if you wash the stomach out and examine it with a magnifying glass you will never find any breach of surface. It is all capillary hæmorrhage. How is one to decide? You can only decide by considering the evidence in favour of each condition. And here, of course, comes in the point about alcoholism. We were told—and there was no reason to doubt it—that this woman took a good deal of alcohol. Of course one did not put it too directly, but when one tried to ascertain whether she took large quantities of alcohol one was left in doubt what the quantity was. She did not deny that she took some alcohol, but she did deny that she took much spirits. She said she chiefly drank beer. Now, on a point like that the evidence of the patient, though not intentionally inexact, is not always accurate. Most people are not accustomed to observe minutely the quantities of alcohol they take nor are able to tell you exactly the amount they drink; so you cannot

take their statement as evidence of the precise quantity consumed. I do not think we can say the evidence amounted to more than this: that she herself was clear that she only seldom took spirits. If she had said she never took spirits, I should have believed her; I should have thought it was sufficient evidence; but as she said she sometimes took spirits and generally took a fair quantity of beer I could not consider we had a positive form of evidence before us. I need not tell you that taking beer, even to the very greatest excess, never produces cirrhosis of the liver; I have never seen anything to support the belief that drinking beer, even in great quantity, has that deleterious effect. It has other bad effects, but it never produces increase of the connective tissue of the liver. So in regard to this woman's habit we were left in this state, that it was not impossible that she did take sufficient quantities of spirit to produce cirrhosis. When evidence is left in that state the fact that we are inclined to take a rather unfavourable view of mankind with regard to alcoholic habits is apt to lead one to think that the patient is alcoholic. In other words, instead of giving patients the benefit of the doubt, as a lawyer would say, you take the opposite course and decide that if it is possible they are guilty they are certain to be so. Well, that is not a judicial proceeding, and it is not the right frame of mind.

Then about the possibility of her having gastric ulcer. The symptom itself, hæmatemesis, is quite consistent with alcoholism, with cirrhosis of the liver. There was no ascites, but ascites is very often absent at the stage of cirrhosis of the liver accompanying a large hæmatemesis. There was no other anatomical condition which could be discovered bearing on the point. It therefore seemed that she might have hæmatemesis due to cirrhosis of the liver. But we had to consider whether her hæmatemesis might be due to gastric ulcer. Observe that there was no distinct account of pain occurring after food. That is very important. In many cases of gastric ulcer there is pain after food. Therefore if there had been a history for some weeks of definite pain after food, I think you would have been justified in believing from that, taken in conjunction with the hæmatemesis, that it was a case of bleeding from a gastric ulcer. But you are not justified in assuming the contrary—that is to say, because there is no pain after food

there is no gastric ulcer—because there are quantities of cases of gastric ulcer in which the patient is unable to give you any history of pain after food. One would think there must be, but in many cases if there is pain the patient has not noticed it and does not describe it when you are ascertaining the history; you may cross-question the patient but you are unable to extract an account of pain. So that the proof-positive symptom, the occurrence of pain after food at a particular time, was absent in this case. Was there anything else in all the symptoms which would help you in deciding between these two conditions? Now, you will observe from the notes that a menstrual period occurred, and I wish to say one word about that. It is, that it is not common in cases of cirrhosis for menstruation to have occurred shortly before hæmatemesis. In order to produce a copious hæmatemesis you must have a well-marked connective-tissue increase throughout the liver. If you will look in the post-mortem room at the ovaries in well-marked cases of cirrhosis of the liver in women who are of menstruating age, you will observe there is often a fairly large connective-tissue increase in the ovaries; sometimes they are completely converted into connective tissue, so that hardly any of their proper cells remain. So that in youngish women who have cirrhosis of the liver and who have hæmatemesis if you go into the history you will find that menstruation has often ceased or been greatly diminished for a considerable time. So that that observation—a very slight one—is rather in favour of the hæmorrhage *not* having been due to cirrhosis. Was there any other point? The fact that there was no ascites I regard as unimportant. If there had been ascites, it would have been very important, but its absence is unimportant. The woman had no wasting of the subcutaneous tissue; her skin was not wrinkled, it was naturally smooth and with the normal amount of fat under it and in the deeper layers of the body wall. Now, that again, though it is not always absent, is a very rare condition in cases of well-marked alcoholic cirrhosis. So, taking those points together, we arrive at the conclusion, and particularly from her general condition, which was much more important than the point I have just mentioned about menstruation, that she had a gastric ulcer, and not cirrhosis, in spite of the history, or the supposed history, of alcoholism. Of course when you see such a patient every day in the

wards, or nearly every day, and become acquainted with her, you are in a better position after two or three weeks to judge whether she is the subject of chronic alcoholism or not. For instance, you can generally ascertain that she feels the want of alcohol very much. This woman did not display anything of that kind, and as her case was observed one felt it was not a question of cirrhosis—that she had not taken very large quantities of strong alcohol. No doubt she had taken a certain quantity of beer, and perhaps occasionally some spirit, but she was not the subject of chronic alcoholism. She was fed by the rectum, the ulcer no doubt healed, and she got perfectly well. That case illustrates very well the sort of suspense of mind which you must often find yourselves in, sometimes for a considerable time, before you are able to decide whether a given case is one of cirrhosis of the liver or one of gastric ulcer.

The next case I shall mention is that of a man who is now in Mark Ward aged 46 years, a coal porter by occupation. He complained of vomiting blood. On May 17th, while coughing, he brought up about two teaspoonfuls of blood. You must remember this, that hæmatemesis occurs in a great variety of ways. Sometimes the patient vomits up as much as a pint of blood straight off; sometimes he brings up a little and then more; sometimes he is in a condition of extreme faintness for several hours and then vomits blood. Sometimes there are no preceding symptoms, but the blood comes up at once; and sometimes he appears to cough up the blood. This patient, at three o'clock in the afternoon of May 17th, felt faint and vomited this blood, which he described as bright red. At four o'clock he coughed up another half-pint of darker blood. He did not cough at all on the latter two occasions. He had begun to suffer from pain in the upper part of the abdomen on May 15th—that is to say, two days before the bringing up of the blood, and this pain usually came on an hour or two after meals and lasted about an hour. The fact that a gastric pain comes on at a definite time after taking food is always a very important point. If you take the cases of duodenal ulcer which are found in the post-mortem room, some of which have been rightly suspected and others and more of them not suspected, during life, and if there are good clinical notes, you will be surprised if you take a series

of cases in how many it was quite clear that the pain did not come on till three hours, or between three and four hours, after food. That is a very definite point, and it may have been overlooked. So I take that as an example in which the ulcer is unrecognised, but it is nearly always the same in gastric ulcer. The pain occurs at a definite time after taking food. Supposing the patient has an acute gastritis—a very common disease, sometimes causing extreme pain on taking food, the mucous membrane is affected over a large area, and the moment he takes food a severe burning pain is felt in the stomach. Gastric ulcer is very rarely in the cardiac end; it is nearly always at the pyloric end, and the pain occurs at some definite period after taking food; sometimes it is as short as half an hour after a meal. On May 15th the patient had this pain. He had felt sick most mornings from about the middle of April, and had once been sick. His history with regard to alcohol was that he had drunk from twelve to fourteen pints of beer a day, with occasional drinks of whiskey—clearly an alcoholic history. Swallowing twelve to fourteen pints of beer would render you very inaccurate in your observations of the quantity of spirits drunk, even if they were taken out of a measured glass, and it is very unlikely our patient used one. So this is a case in which the man did probably drink spirits to excess. And here I would impress upon you an important point which you should bear in mind. We know for certain that concentrated alcohol produces definite structural changes; it is the one kind of material taken into the body which does produce such definite change. You may make post-mortems on the bodies of people who have smoked to excess, but you will not find any structural change which you can associate with that smoking; there is no structural change brought about by smoking which you can put up into a museum bottle and label. You see people who have become extremely wasted, obviously profoundly affected by constantly taking morphia, but if you examine them post mortem you will not be able to find any visceral change which you can point to as resulting from the taking of morphia. It is different with alcohol, and of all the visceral changes which are produced by alcohol, the most definite and certain is that produced by connective-tissue increase, which we call cirrhosis of the liver. You can be certain of that because you can see it.

The clearest observation of the fact may be seen in children whose parents give them quantities of spirits, partly because they take spirits themselves, and as a result the child is brought to the hospital with a very large liver. That liver shrinks; you can observe it shrink. Then the child has ascites, which you relieve by paracentesis, and after paracentesis you find the liver very much reduced in size, and it finally disappears beneath the costal arch. Some time after that the child may become worn out and die, and if you examine it post mortem you find definite cirrhosis of the liver. Those cases, to my mind, conclusively prove that alcohol does produce cirrhosis of the liver. So from those cases in which there has been no other obvious cause you can deduce the general fact that alcohol will produce cirrhosis of the liver at any age. But you must remember that, because we do know that there is this definite structural change produced by alcohol, we must not assume that alcohol will always produce cirrhosis of the liver. What the particular determining circumstances are we do not know, but it is quite certain that people have lived to extreme age and taken enormous quantities of the strongest forms of alcohol and yet have never had cirrhosis of the liver. So when you get a history like this you must not assume that because a man has taken alcohol largely he has necessarily got cirrhosis of the liver. As you go on in practice you are sure to have innumerable wonderings about this, and I do not know any point in regard to which it is more difficult or necessary to keep the mind in a proper judicial frame. A man is brought to you; he has considerable ascites; you cannot feel his liver, his attendant tells you he has taken a bottle of brandy before one o'clock every day, and he has perhaps brought up a little blood. Nothing seems more likely than that the man has cirrhosis of the liver. He dies three months afterwards, and it is then perhaps found that what he had was a diffuse new growth—I am mentioning the kind of case I have seen myself—he has diffuse growth of the peritoneum, but no cirrhosis. So, while remembering that alcoholism will produce cirrhosis of the liver; you must not assume that because alcoholism is present therefore cirrhosis is also present. This man was fairly well nourished, and I think you will find that point about whether there is much fat in the subcutaneous tissue a very use-

ful one in helping you to determine the question of the presence or absence of cirrhosis. It is rare in cases of cirrhosis for the subcutaneous fat not to be largely wasted. The blood in this man's case obviously came from the abdomen. On May 19th, the day after he came in, he vomited six ounces of bright red blood and became blanched. Now, unless the patient were frightened—and this man was not a nervous subject—the loss of six ounces of blood would not produce blanching, and one may assume from that that he had lost more blood than he vomited. The pulse was 100 and he had sweated. He complained of no pain in the abdomen. An icebag was applied to it. In the afternoon the pulse was 94. The pulse always goes up after such a hæmorrhage unless the hæmorrhage is so extreme as to produce failure of the heart's action. Some black material was found in his stools, and his stools remained black until May 22nd. After that they were brownish and there was no further hæmorrhage. When he had had these hæmorrhages I saw him, and felt extremely anxious as to whether he would not die from the amount of blood he had lost. His pulse was so weak and his whole appearance was one of such extreme feebleness that it seemed very likely he would die as a direct result of the hæmorrhage. Undoubtedly that man also had gastric ulcer. He was fed by the rectum and ceased to bleed, and now he has almost recovered. His colour is not quite what it was before, but he is getting it back and there is no doubt his ulcer has healed. I think both these cases are instructive because they are both instances in which without very great care, and without resolutely determining not to decide the matter on one point of the evidence only, you might have imagined that the patients had hæmatemesis due to cirrhosis. Such cases are very common.

The third case was that of a man in Mark Ward aged 46 years, who was jaundiced. What the cause of his jaundice was was not quite clear. He was said to have been in his usual health till the beginning of April, when he felt sick after taking some pills. A day or two afterwards he was told he was jaundiced. That is not an uncommon history. The patient takes some pills, they produce gastric irritation, that produces catarrh of the duodenum, and the catarrh spreading up the common bile-duct, an attack of jaundice results.

He was able to do his work until May 2nd, when he took to his bed and vomited once. He brought up his food streaked with blood. That was said to be the case before admission. At one time of his life he was a heavy drinker, and said he had been getting thinner for some time, but he did not admit he had drunk to excess lately. The skin was very much scratched; it had been much irritated by the jaundice. We remained uncertain as to the cause of his jaundice. There was no distinct evidence of acute pain, there was no proof that he had gall-stones, and at the same time the man looked so ill that it seemed likely he had some other obstruction than that of mere catarrh. What the cause of his looking so very ill was we did not discover while he was alive. He died on May 19th, and these are the circumstances under which his death took place: He complained of definite abdominal pain, and on the 18th—that is to say, a day before his death—he vomited about an ounce of blood. The pain became more acute, and was situated principally in the epigastric region, and it was increased on pressure. The abdominal walls were rigid, so that one could not feel any of the viscera. On the morning of the 19th he suddenly became collapsed, sweated a great deal, became blanched, and was very restless. The pulse was of very low tension. He vomited half a pint of blood and passed a black stool. His pulse gradually disappeared, his other symptoms increased, and he died at eleven o'clock in the morning. Post mortem this man was found to have a gastric ulcer, and it was of the hæmorrhage from that ulcer that he died. The stomach contained a very large amount of recent clot, and an ulcer was found occupying the lesser curvature, nearer the cardiac than the pyloric end. It measured two and a half inches in length, and had well-defined edges. The man complained of pain towards the end of his illness—that is to say, a day or two before death. He had obvious abdominal uneasiness—I do not know that you can call it pain—at the time he came in, and he had well-marked jaundice. So there again was a case with a history that in the past large quantities of alcohol had been taken, and it was another instance in which you might easily have assumed that the man had cirrhosis of the liver. Jaundice is not necessarily an accompaniment of cirrhosis, but it occurs in many cases, due to various causes. It

is a common attendant symptom of cirrhosis and it was present in him. He suddenly died from hæmatemesis. Yet the diagnosis of cirrhosis of the liver would have been wrong, for what the man had was gastric ulcer.

Those three cases are, as I have said, instructive as showing the extreme importance of not being led away by a history of alcoholism. Such a history was present in every one of the three. If, without minute examination, you had taken that history in the three patients as regards drink you would have felt justified in saying that the hæmatemesis was produced by cirrhosis of the liver. And that is the first lesson I want you to learn from this series of cases.

Secondly, they are all interesting as showing what comparatively slight symptoms gastric ulcer may give rise to, although it may cause a hæmatemesis which may be fatal. The woman, you will remember, hardly complained at all of pain after food. The man whom I mentioned, who is still alive and who has recovered, only complained of a very slight degree of pain after food, which pain really began almost contemporaneously with his hæmatemesis. And in the last case, supposing the man had complained of severe abdominal pain, you might have been inclined to think that it was due to gall-stone. He made use of no expressions which would lead us to suppose the pain was situated actually in his gastric wall.

Having mentioned those illustrations of the commonest causes of hæmatemesis, I would advise you in every case of hæmatemesis to proceed to consider those common causes. First of all decide, either from examination of the specimens of blood before you, or from the stools, or from a careful weighing of the evidence which you are able to collect and of the history, whether the hæmorrhage was from the alimentary tract—that is to say, whether it has been a true vomiting of blood or not. You cannot give too much attention to deciding that point. Having decided that, proceed to consider whether it is due to gastric ulcer or to cirrhosis of the liver. There are many cases in which you will be able to decide that immediately. Anæmic girls who have obviously not taken alcohol to any excess frequently have most copious hæmorrhages from the alimentary tract, and in most of those cases you will be able to get a definite history of gastric pain. But remember that gastric ulcer,

although it is much commoner in women and in the earlier part of life—that is to say, in young adult life—does occur very commonly in both sexes, and at any time of life. I have seen it in people over 70 years of age. Of these three cases the youngest was 35 and the others were aged 46. So fix those two points in your minds: always to determine whether there has been actual hæmatemesis at all, or whether the blood has come from somewhere else, such as the lungs or the fauces. Secondly, proceed to determine whether it is due to cirrhosis of the liver or to gastric ulcer.

Now, supposing you are able to conclude that it is due to neither of those cases. It is a thing which will rarely happen, but now and again you may find a case in which there is copious hæmatemesis, but in which on going carefully into the signs and the history you are not satisfied that it is due to either of the causes I have mentioned; then there are innumerable possibilities. One thing which always used to be thought of in the Middle Ages, though we practically never think of it now, is poison. In about the year 1400 when a patient vomited blood, without further inquiry it was regarded as a case of poisoning. And when his body was opened after death and found to show no sign of internal blackening, it was concluded that he could not have been poisoned; so that their reasons for thinking a man poisoned and for not thinking him poisoned were equally erroneous. We do not think of that now, and yet you may come across cases of poisoning, and therefore it is worth having in your mind what substance is likely to produce hæmatemesis. I have seen a few such cases. If a patient has not obviously taken any poison and nevertheless a hæmatemesis has occurred, the only other suspicion which will cross your mind is that he has had arsenic. I have seen strong acids cause it, such as oxalic acid and nitric acid and sulphuric acid, but in those cases there was abundant evidence that the patient had swallowed a corrosive poison; there was no question about that. But if there is any doubt about a patient having had a poison, arsenic is the most likely substance. That is the sort of thing which a wise man will keep to himself and store up in the recesses of his mind for use when he sees a suspicious case of hæmatemesis which he believes not to be due to either gastric ulcer or to cirrhosis of the liver.

It would be a pathological exercise to discuss all the possibilities of abdominal aneurysm bursting into the stomach or into the œsophagus, and the blood being swallowed and then brought up or of hæmatemesis due to hepatic thrombosis. Those, again, are only suppositions which you will have recourse to if you find that the case does not come under the common conditions which I have described.

SOME RECENT ADVANCES IN RECTAL SURGERY.*

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THE diagnosis of rectal troubles is not usually a difficult matter, an examination with the finger being all that is necessary in most cases. It is therefore all the more remarkable that mistakes are so frequently made. At a hospital like St. Mark's, where we see a very large number of cases of rectal disease, it is quite common to see cases where a wrong diagnosis has been made, the most serious mistake being that of mistaking a case of carcinoma of the rectum for piles or fistula. Most of the mistakes arise from not making a proper examination of the rectum, the diagnosis being made from the symptoms or external appearances only. The importance of making a digital examination in all cases of rectal troubles, however obvious they may seem, cannot be too strongly insisted upon. At St. Mark's we frequently see cases which have been treated previously, often for months, as piles which on examination prove to be carcinomata. In such cases the disease is usually too far advanced for removal, and if we are ever to be successful in saving sufferers from rectal cancer it is absolutely necessary that all patients who complain of rectal troubles should be examined digitally at the earliest possible opportunity.

Several mechanical aids to diagnosis in diseases of the rectum have been devised within recent years and some of them prove most useful in certain cases. Of course nothing is so good as the educated finger for purposes of diagnosis, but there are cases where the finger is not sufficient or where it can be supplemented to advantage by the use of different forms of specula. The number of different kinds of rectal specula is legion, and yet very few of them are satisfactory; most of them fail because they are very painful to pass or to withdraw or else because nothing can be seen through them. The greatest improvement has been the introduction of the Kelly tubes. The

* Delivered before the St. George's Hunterian Society.

most useful of these is certainly the short tube called by Kelly the sphincteroscope; as originally devised by Kelly, it had too sharp an edge, but

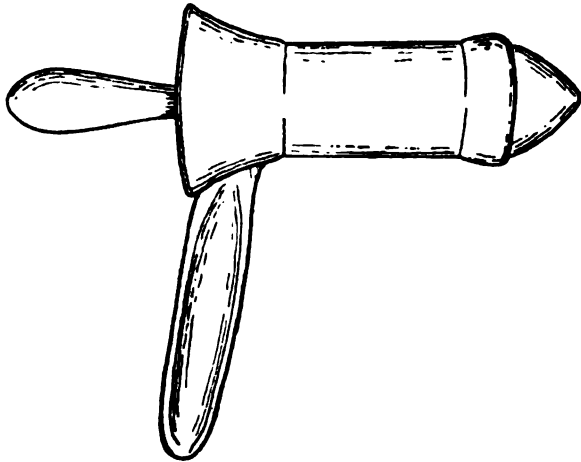


FIG. 1.—Modified short Kelly tube with obturator.

the pattern which is used at St. Mark's has been improved by the addition of a collar which forms a broader edge to the tube. With this instrument it is possible to obtain an excellent view of the last two or three inches of the rectal canal. The instrument is very easily passed and does not cause pain. It is of special value in the diagnosis of internal hæmorrhoids as it is the only form of speculum with which they can be properly examined. Internal piles cannot be felt by a finger in the rectum, and some means by which they can be easily seen is therefore useful.

In certain cases where the piles are very large one can sometimes feel redundant folds of mucous membrane from which one can generally safely infer that internal piles are present, but this is by no means a reliable method of diagnosis and in the majority of cases of internal piles nothing can be felt with the finger. Of course by getting the patient to strain the piles frequently prolapse sufficiently to be seen, but this is not always successful, and does not show the piles *in situ*. The way in which the instrument is used is to pass it into the rectum and then withdraw the obturator, the tube is then slightly withdrawn and pushed back again; any piles that are present will prolapse into the tube and can easily be seen; by gradually withdrawing the tube and repeating this manoeuvre all the piles and mucous membrane can be examined with the greatest ease and

accuracy. This instrument is also of value in examining carcinomata situated low down in the rectum.

The six-inch Kelly's tube is also a very useful instrument in many cases. By means of it the valves of Houston can be examined and any ulcerations in the rectum can be seen and treated locally by instruments passed down the tube: it is also of value in the diagnosis of strictures or growths situated high up in the rectum. In using this tube a forehead lamp is a necessity and the patient is usually placed in the genu-pectoral position in order to obtain ballooning of the rectum beyond the tube. It is often possible, especially in women, to use this tube in the left lateral or Sims' position, and in women this position is much to be preferred when possible.

The longer Kelly tubes have proved of little value for two reasons—(1) it is difficult to obtain a satisfactory illumination of the rectum through such long tubes, and (2) they are difficult and

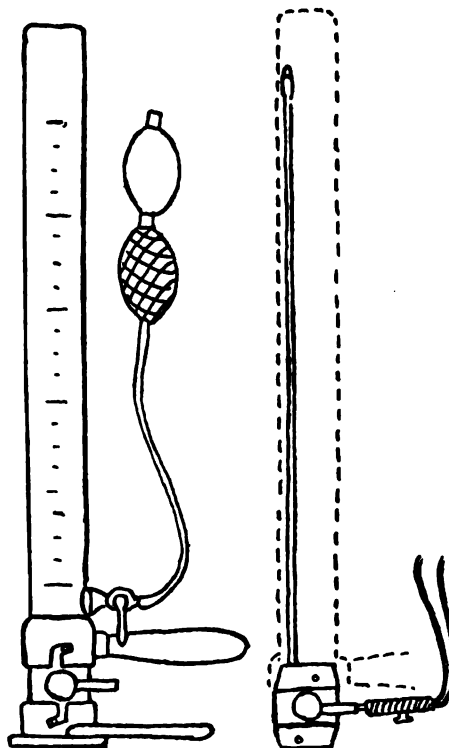


FIG. 2.—The sigmoidoscope.

often dangerous to pass. The pneumatic sigmoidoscopes have entirely replaced these tubes. Several different forms of pneumatic sigmoidoscope or

rectoscope have been invented, but in my opinion Straussom's is by far the best of these, and it has proved a most satisfactory instrument. This instrument is thirty centimetres long, and with it it is possible to examine the whole of the rectum and the greater portion of the sigmoid colon. Illumination is obtained by means of a lamp situated about an inch from the end and arranged so that it can be entirely removed for cleaning purposes. The tube is closed at the back by a glass window, and there is an arrangement by which air can be pumped into the tube so as to inflate the rectum or sigmoid. The tube is used most easily with the patient in the genu-pectoral position, but it can also be used with the patient in the Sims' position if a cushion is placed under the buttock. After the tube has been passed six inches the obturator is withdrawn and the tube pushed on by sight, so that the surgeon can see where the end of the tube is going to and by dilating the bowel in front by pumping in air he can prevent the end of the tube from touching the rectal wall. The tube is, in fact, passed in behind a cushion of air, and consequently no damage can result to the walls of the bowel, however diseased they may be.

After the tube has been passed in as far as it will go it is slowly withdrawn and as it is being pulled back the whole lumen of the bowel comes into view, and any growth, ulceration or other abnormality can be detected, if present, and examined. Should a growth be found its exact dimensions can easily be ascertained, and by watching whether or not it moves with the intestinal wall on inflating the bowel, or by pushing it gently with the end of the tube, one can easily determine its mobility and estimate the chances of successfully removing it by operation. The distance of any lesion from the anus is ascertained by looking at the graduated scale on the outside of the tube. Should it be necessary to swab away any blood or faecal material from the surface of the growth or even to remove portions of it for microscopical examination, this can be done by removing the back glass of the instrument and passing swabs on special holders down the tube or by using special forceps made for the purpose.

This instrument does not cause any pain or even discomfort when being used, and I have only once had to give an anæsthetic for examination with it.

The distance to which this tube can be passed

varies considerably with different patients. In patients who have a long sigmoid mesentery and no adhesions round the bowel it is usually possible to pass the tube to its full length, and to see well beyond the middle of the sigmoid flexure; in one case I was able to see into the descending colon.



FIG. 3.—The appearances seen through the sigmoidoscope in two cases of cancer in the sigmoid flexure.

When, however, the mesentery is short or the bowel is surrounded by adhesions the tube cannot be passed beyond the last loop of the sigmoid.

The value of this instrument in certain cases is considerable. It enables us in the case of a malignant tumour situated high up in the rectum or in the sigmoid flexure to obtain exact knowledge of such a growth, to tell whether or not it is removable, and if so by which route it may most easily be reached.

This is no small gain over present methods. Hitherto growths situated out of reach of the finger *per rectum* have had to be guessed at from the symptoms or an exploratory laparotomy has had to be performed to examine them. It is true that a



FIG. 4.—Cancer high up in the rectum seen through the sigmoidoscope.

certain number of growths situated in the sigmoid colon can be detected by careful palpation through the abdominal wall under deep anæsthesia. As a rule, however, it is only growths that have reached a considerable size that can be detected in this way, and growths just above the pelvic brim cannot

be felt at all *per abdomen*. Moreover the knowledge gained by palpation through the abdominal wall is usually very inexact and often unreliable. Exploratory laparotomy is, after all, only the resort of the destitute, and no surgeon likes to perform such an operation if he can possibly avoid it. I think the sigmoidoscope should be welcomed as a useful aid to diagnosis in these cases. The following case is a good example of the value of the instrument.

The patient was a man *æt.* 71 years. When I first saw him he complained of constant diarrhoea and the passage of blood and slime by the rectum. He stated that these symptoms had only developed during the last two or three months and that he had previously been in good health. From his symptoms it seemed almost certain that he was suffering from a carcinoma of the rectum or sigmoid flexure. On examining the rectum with the finger nothing could be felt, and on examining with a six-inch Kelly tube nothing could be seen. Palpation of the abdomen and a bimanual examination also gave negative results, although the abdominal walls were very lax. As I felt certain that there must be a growth somewhere high up in the rectum I examined him a week later at St. Mark's with the sigmoidoscope. I was then able to see the growth, which was of about the diameter of a two-shilling piece; it was situated on the anterior wall of the bowel in the lower part of the sigmoid flexure, and on gently pressing it with the end of the tube I was able to ascertain that it was movable. While the patient was making up his mind as to whether he should come into the hospital he developed intestinal obstruction and was admitted into the West London Hospital, where he was operated upon by Mr. Keetley who found the growth to be exactly as I had seen it.

The next case is an interesting contrast.

The patient was a man *æt.* 45 years. He was partly paralysed in the left leg and walked with a stick. He complained of alternating constipation and diarrhoea and also of frequently passing large pieces of slimy mucus *per rectum*. As it appeared possible from his symptoms that he might be suffering from a malignant growth in the bowel I examined his rectum and sigmoid with the sigmoidoscope, having previously ascertained that nothing could be felt by the finger. The tube passed easily to its full length and I was able to examine

the whole of the rectum and sigmoid and even to see into the descending colon. Nothing like a growth could be seen, but it was noticed that the mucous membrane had a dull white shiny appearance suggesting that it was atrophied, there were also patches of injected mucous membrane in one or two places. On more carefully examining the patient's general condition it was obvious that he was suffering from some chronic affection of the central nervous system, which was probably commencing disseminated sclerosis, and that the condition of his bowel was due to trophic nerve changes.

The value of the instrument as a substitute for exploratory laparotomy is well shown by a case which I saw in consultation recently. The patient was an elderly gentleman, thought to be suffering from a carcinomatous growth situated high up in the rectum. He had the usual symptoms of such a growth, and it was thought that in getting him to strain down something could just be felt.

I was asked to examine him with the sigmoidoscope in the hope that an exploratory laparotomy might be rendered unnecessary. With the sigmoidoscope the whole of the last 15 inches of the bowel were easily examined, and it was proved beyond a doubt that no growth existed in this portion of the bowel.

He had a large number of piles, and it was no doubt the bleeding from these and a certain amount of colitis from which he was suffering which accounted for his symptoms.

I may mention several other cases in which this instrument has proved of the greatest value, but these are sufficient to illustrate its range of usefulness.

FISSURE IN ANO.

Fissure is certainly one of the most painful of minor surgical ailments with which we have to deal and there is nothing that renders a patient more grateful than the successful treatment of this affection.

For purposes of treatment cases of fissure can be divided into two classes, acute cases, where the fissure is of recent origin, and chronic cases.

In the acute cases the pain disappears at once, and in most cases the fissure is cured if the sphincters are thoroughly dilated; this, however, necessitates an anæsthetic and cannot always be done. Many cases, again, can be cured by application of suitable ointments, but in the more painful cases this often

fails owing to the patient being unable to properly apply the ointment on account of the pain which its introduction causes. A method which was first, I believe, suggested by Dr Tuttle of New York, and which has proved very successful at St. Mark's, is the local application of pure ichthyol. The fissure is first exposed as much as possible and some orthoform powder is blown into it with an insufflator; this gets rid of the acute tenderness and enables the speculum to be passed. The fissure can then be examined, and for this purpose a small laryngoscope mirror is often most useful. Some more orthoform is then blown into the fissure and it is painted over with a little pure ichthyol on the end of a probe; a small piece of cotton-wool is next placed over it to protect the surrounding mucous membrane from the action of the ichthyol and the speculum is withdrawn. This is repeated every few days until the fissure is cured, which usually occurs in four or five days. The pain usually disappears after the first application.

In the more chronic cases of fissure something more radical than this is necessary. At St. Mark's Hospital we generally divide the fissure and the greater part of the external sphincter under eucaïne anaesthesia, and cut away the indurated edges so as to leave a wound which has free drainage externally. It is very important to make the incision come out well on to the skin and to always divide the fibres of the external sphincter exactly at right angles.

This operation is done in the out-patient department, and the patient comes up to the hospital every day to have the wound dressed. The wound generally heals up quite readily, and it is very rarely that we find it necessary to take a case of fissure into the wards. I think it is much better to confine the patient to bed for the first week or ten days after dividing a fissure, but this is impossible when dealing with a large number of cases, as at St. Mark's, and in practice the ambulatory method proves very satisfactory.

FISTULA.

The treatment of fistula has not altered much since the days of Salmon, except that the healing of the wound is now more rapid and there is less liability to complications owing to the use of antiseptics. The only improvement has been in attempts to obtain primary union by excising the fistula and stitching up the wound instead of leav-

ing it open to granulate. This is certainly the ideal operation, but it is only possible in a very small number of cases. In a few cases, where the fistula is uncomplicated, is very superficial, and opens straight into the anus, it can sometimes be performed with success, but such cases are, unfortunately, rare. To be successful it is absolutely necessary that the whole wound should be closed by stitching, as if any cavity is left a fresh abscess is almost certain to form.

PILES.

Many attempts have been made to find a method of operating upon piles by excision, so that primary union can be obtained in the wound afterwards. Whitehead's operation is designed on this principle and it has been adopted by a considerable number of surgeons. There has at different times been a great deal of argument as to the relative merits of Whitehead's operation and the older operation by ligature. There can be no doubt that the results of Whitehead's operation are often very satisfactory; but the results, I think, are no better than those obtained by the ligature operation except in a few special cases, and it has several disadvantages which are not common to the ligature operation. Thus Whitehead's operation cannot be performed under 25 minutes and often takes longer, while the ligature operation can be performed in anything from 4 to 10 minutes. Whitehead's operation is a much more severe procedure than the ligature and the complications that may follow it are more numerous and more disastrous.

It has been claimed for Whitehead's operation that it is not followed by recurrence. I believe it to be correct that true venous piles do not occur afterwards, but a condition which is every bit as bad certainly does. Within the last few months I have seen two cases of recurrence of symptoms after this operation. In both of these portions of the mucous membrane of the rectum had become hypertrophied and ulcerated and prolapsed on examination. These masses formed a sort of arterial pile, which, though it differed slightly in appearance from the true venous pile, bled, if anything, more freely and caused the patient more discomfort and pain than the original affection.

Recurrences after the ligature operation are very rare indeed. In fact, the operation by ligature as

it is performed at St. Mark's—that is, where the pile is cut right up to its base and ligatured—leaves little to be desired. The mortality is less than an 1/4th per cent., recurrences are very seldom seen, complications are extremely rare, and I doubt if there is another operation in surgery which gives such uniformly good results. I think Whitehead's operation should be reserved for a few special cases which cannot be easily dealt with by the ligature.

Another operation which aims at excision of the piles is Earle's. In this operation the pile which it is desired to excise is seized in special forceps and then cut off above the blades. The edges of the wound while still grasped in the forceps are stitched together with catgut, the forceps being withdrawn after all the stitches have been passed and before they are tightened up. I have tried this operation, but the results seemed to me not to be any better than the ligature operation and the operation is not so easily performed. It is also only applicable in cases where there are one or two isolated piles, as it causes considerable drawing up of the mucous membrane, which tends to narrow the bowel.

Leaving the subject of the operative treatment of piles, I shall briefly refer to what has been called the palliative treatment of this affection. Of course there is no doubt that in all the more severe cases of piles, especially those which are complicated by extensive ulceration or prolapse, the only satisfactory form of treatment is operation. In fact, operation is by far the most satisfactory method of treatment in most cases of piles other than those where the piles are merely a symptom of some circulatory disturbance such as cirrhosis, etc., as it enables the patient to be cured entirely, with a minimum of risk, in the space of ten days or a fortnight.

We must recognise the fact, however, that many patients have a great objection to undergoing an operation, and that others are quite unable to spare the time necessary. In these days of bustle the difficulty of sparing enough time to undergo an operation is often a very serious one, and it is important to know of methods of treatment which can be carried out without having to confine the patient to bed.

The injection treatment, which had a great repute not long ago in America, has now been

almost entirely given up, at any rate in this country, as it is not free from risk and is unreliable.

One of the best methods of treating piles apart from operation is by hot or cold water injections. At St. Mark's we give the patients a 6-ounce rubber rectal syringe and tell them to inject some hot water into the rectum first thing in the morning and last thing before retiring for the night. This, combined with the use of suitable astringent ointments, will quickly cure or relieve a considerable number of cases. It is of course necessary to treat at the same time any constipation or error in diet.

There are some cases of piles which can be very successfully treated by simple dilatation of the sphincters. This method of treating piles was first suggested by a French surgeon, M. Verneuil, in 1871, and it has been very popular in France. The cases in which this treatment proves most effectual are those where there is marked spasm or hypertrophy of the sphincter muscles. If this spasm be overcome, the symptoms disappear and the piles are in many cases cured. The method of overcoming this sphincter spasm most frequently recommended is by full dilatation under an anæsthetic. This is, however, so little short of an operation that it possesses but few advantages over that procedure. Gradual dilatation by the occasional passage of a bougie has been recommended by several authorities and is often all that is necessary. I have recently tried this method in appropriate cases and have been very pleased with the results. In place, however, of using a bougie I have used a special set of graduated dilators which I have had made for me by the Holborn Surgical Instrument Co.; they are made on the same principle as Hegar's well-known dilators, and they have proved most satisfactory. They start at the largest size of Hegar's dilators and go up to 2 inches in diameter. With them the sphincters can easily be dilated without administering an anæsthetic; they dilate perfectly evenly and cannot cause tearing of the mucous membrane; they are much better than any of the mechanical forms of dilator, which are very painful to use and may cause considerable laceration of the mucous membrane.

In using these dilators the smallest size is passed in and left for two or three minutes, the next size is then passed and left in for a similar time; in this way three or four sizes are passed. This

procedure is repeated in a few days or a week. I think this method of treating piles combined with proper medical and dietetic treatment should prove very useful, in suitable cases, for patients who do not wish to undergo an operation, or who cannot afford to lie up for the necessary time, as it can be carried out without in any way interfering with their ordinary occupations. It should also prove useful in cases of piles complicating pregnancy or other conditions which contra-indicate operation.

CARCINOMA OF THE RECTUM.

The advances in the operative treatment of this disease within recent years cannot be said to have been great. There are, however, several points of interest and value to be noted if we survey the improvements that have been attempted in this direction, and especially the lessons that have been learnt as the result of clinical experience and observation.

The first point of interest concerns the value of colotomy for the relief of carcinoma of the rectum. Since the improvements in the operation for colotomy resulting from the substitution of the inguinal for the lumbar route it has become a common dictum that in those cases of carcinoma of the rectum which are unsuitable for excision, colotomy should be performed. The supposed advantages of performing colotomy in these cases is that the deflection of the faecal current delays the rate of growth of the tumour and prevents or to a great extent relieves the pain and tenesmus which are the worst features of this disease in its later stages. Unfortunately, these promises have not been realised.

As regards the question of prolonging the patient's life, it seems very doubtful if colotomy is of any value apart from the relief of obstruction.

Most of the cases of carcinoma recti, treated by colotomy alone, die within a year of operation. Batt's statistics quoted by Sir Charles Ball show that of 32 patients who recovered from the operation only two survived a year. Tuttle, in an analysis of 20 cases, found that none had survived one year from the operation and consequently gave it up. The St. Mark's figures seem to show that colotomy does not lengthen the patient's life and does very little to relieve the symptoms. The pain and tenesmus result from the presence of an ulcerated growth in the rectum

and from the pressure of the growth upon surrounding nerves, and colotomy cannot in any way relieve this. When obstruction has occurred colotomy is, of course, indicated and quickly relieves the symptoms; but obstruction is not at all common in cancer of the rectum, though it frequently occurs in cancer of the sigmoid flexure or colon. In cases where there is an ulcerating growth at the anal margin involving the skin, colotomy sometimes relieves a good deal of the pain, but such cases are benefited to a far greater extent by curetting or cauterising away the growth. I do not think the value of curetting or cauterising the growth in inoperable cases of cancer of the rectum is sufficiently appreciated. I saw a case recently which has been treated in this way for five years. The patient is a shop-keeper and during the whole five years, except for the brief intervals during which he has been in the hospital, he has continued to conduct his business and is still doing so.

EXCISION OF THE RECTUM.

A good deal has been written recently upon the abdomino-perineal route for removing the rectum and several very ingenious operations have been devised. Czerny was the first surgeon to suggest this route, and the steps of his operation have since been modified. Of the different forms of technique that have been suggested that which Sir. Chas. Ball describes seems to be the best and simplest. These operations for excising the rectum from the abdomen enable us to successfully remove growths high up in the rectum which have previously been considered inaccessible. Hitherto the abdomino-perineal route has had rather a high mortality, and although this will probably be much improved in the future, the operation will probably never be as safe as the perineal or sacral operations, and it should be reserved for those cases which cannot be dealt with by the latter methods. The sacral or Kraske's operation is now the most popular in this country. I think, however, that the perineal operation as improved by Quenu will eventually replace it again, except in special cases. By the perineal route, if Quenu's technique is adopted, it is possible to remove 6 or 8 inches of the rectum, and still get the end of the sigmoid down to the skin and so restore the anus. It seems to me personally that this operation is better than Kraske's. It enables one to clear out all the cellular tissue

and lymphatic glands in the hollow of the sacrum with the tumour—a most important part of the operation—and it does not result in the mutilation which is inseparable from Kraske's operation.

The chief improvement in the operation consists in first of all dissecting up a cuff of mucous membrane from the sphincters sufficient to allow of the rectum being clamped or ligatured; the rectum is then dissected out as a closed tube without being opened, and soiling of the wound can thus be avoided. The peritoneum is opened early in the operation and the lateral attachments and the meso-rectum divided sufficiently to allow of the whole rectum and growth being brought down outside the wound and of a healthy portion of the bowel above the growth being stitched to the skin margin without tension. The peritoneum is then stitched up and the deeper portions of the wound brought together. Last of all, the rectum is divided above the growth and the edge of the bowel stitched to the skin margin.

This is, I think, a great advance upon previous operations, as it attempts to render the operation aseptic and to obtain primary union in the wound. This should do much to lower the mortality from excision of the rectum, 80 per cent. of which has hitherto been due directly to septic complications. The operation is rendered easier and safer if a preliminary colotomy is performed, and I believe it to be the best plan in the majority of cases. If the operation is entirely successful and good sphincteric control is obtained, the colotomy opening can subsequently be closed.

Radiography and Hip Disease.—Lovett and Brown undertook to determine what value radiographs possessed, taken by themselves, in the diagnosis of hip disease, and especially in the detection of early disease. One hundred consecutive negatives of the hip-joint were examined. The clinical history of each case was looked up later, and the value of the opinion formed from the radiograph tested in this way. They conclude that a radiograph free from abnormal appearances does not show that hip disease is absent or will not develop, but that in a case of doubtful clinical diagnosis a normal X ray is a matter of weight and makes the likelihood of speedy recovery greater than will a radiograph with abnormal appearances. —*Journ. A. M. A.*, vol. xlv, No. 6.

HYPNOTISM. By J. MILNE BRAMWELL, M.B., C.M. (London: Grant Richards, pp. 477.)

THE practice of hypnotism has for many years been viewed with suspicion by the medical profession, a large number of whom, if they were asked about the subject, would probably have to reply that they had no knowledge or personal experience of it. It is therefore desirable that a work, like that of Dr. Bramwell, which gives a full account of the whole subject, should be accessible to members of the medical profession, so that they may at least have the opportunity of making themselves acquainted with this line of treatment. The book opens with a historical account of the pioneers in hypnotism, Elliotson, Esdaile, Braid, etc., and while it would appear that scant justice was meted out to them, it is probable that they were more fitted for the rôle of martyrs than that of great pioneers in medicine. Many curious facts are related in connection with the experimental phenomena of hypnosis, but as these are collected from many writers in many countries one will naturally hesitate to accept them all as authentic. We can perfectly well believe that defæcation or urination or lachrymal secretion may be induced by hypnosis as by any other emotional state, but that bleeding from the skin or the production of blisters can be the result of suggestion merely seems to require more reliable testimony than we have before us. Medical men are more interested in the subject of the value of hypnotism in medicine and surgery than in hypnotic theories or experiments. Dr. Bramwell has employed hypnotism with success in the induction of anæsthesia for operative treatment, chiefly in connection with dental work. A preliminary course of hypnotic anæsthesia seems to be advisable in order to secure the best results. The ideal results, however, are culled from the writings of Dr. Fanton, who says that in midwifery practice "suggestion acts directly on the uterus itself; the operator can thus cause its contractions to appear or disappear at will; and, in uncomplicated cases, this may save the life of both mother and child. The after-contraction of the uterus can be excited by suggestion, and post-partum hæmorrhage prevented." It is also claimed by Dr. Fanton that he can induce premature labour by suggestion, and he considers it criminal to have recourse to other means. If this be so we are afraid that

criminal abortion will become an easy, safe, and frequent occurrence, but share the doubts of the author as to the reliability of Dr. Fanton's statements. The experience of Dr. Bramwell, and we suppose of other medical hypnotists also, is that the best results are obtained in cases of functional nervous disorder. This sphere is also shared largely by many irregular methods of medical practice, and the successes of "faith-healing," of "Lourdes," and of the more recent "Christian science," are obtained in cases of this description. It is not unnatural to conclude, therefore, as many have done, that the personality and reputation of the hypnotist, along with the mental and emotional excitement of the patient, have a good deal to do with the results of suggestive treatment, and that the assumption of any other curative influence is unnecessary. Many cases of functional nervous disorder are related in which hypnotism has succeeded when other methods of treatment have failed. We note with pleasure that Dr. Bramwell does not regard hypnotism as a panacea, but as a branch of medical therapeutics, which may in certain cases give results which neither drugs nor other methods of treatment can produce. His summary of the whole subject is calm and judicial in tone, and we might suggest its use as an introduction to, instead of the conclusion of the volume. The whole work is admirably adapted for the use of medical men who are desirous of acquiring an authoritative introduction to hypnotism, and one cannot help recognising in Dr. Bramwell not only the enthusiast in this line of practice, but also the earnest student and the cautious scientist.

WE have received samples of "Tabloid" Quinine, Camphor and Aconite from Messrs. Burroughs and Wellcome, containing quinine bisulphate, $\frac{1}{4}$ grain; camphor, $\frac{1}{4}$ grain; tincture of aconite, 1 minim. This preparation is a valuable diaphoretic and antipyretic in the prevention or treatment of catarrh and influenza. It is also indicated in inflammatory conditions where aconite reduces the rate and force of the heart, and assists quinine and camphor in promoting diaphoresis and combating fever. The "Tabloid" product is convenient and portable, allowing of easy administration, and disguising the bitter taste of quinine. The dose is one every half-hour, till diaphoresis is produced and the pulse slowed.

SOME HEALTH RESORTS IN FRANCE. No. VII.

Saint-Honoré.—On September 14th an early start was made from Bourbon-Lancy, and the special train conveyed the party of medical visitors to within a carriage-drive of Saint-Honoré, which was reached about half-past ten, the bathing establishment looking charmingly fresh and attractive, situated in a beautifully wooded park. Saint-Honoré is about eight hours' journey from Paris and is over 900 feet above the sea-level. The waters are supplied by four springs and are described as alkaline, sulphurous, and arsenical. The bath appointments are well up to date and the excellent arrangements for treatment by "pulverisation" deserved and received the special attention of the professional visitors. A method of applying hot douches to the feet is quite a feature at Saint-Honoré and its general therapeutic effect is claimed to be very remarkable; the feet of the patient are put through specially protected openings in the wall of one room so that they protrude into an adjoining apartment where the hot douche is applied till the feet are red. The special indications for sending cases to Saint-Honoré are pulmonary affections, skin diseases, and scrofulous troubles. The climate is mild, the air is pure, and the environs are interesting and pretty. The season lasts from the middle of June to September 15th.

Pougues.—On September 15th the "paradise of the dyspeptic," as Pougues has been called, was visited by the party of medical men. This delightful watering-place lies on the right bank of the Loire, about four hours' journey from Paris. The waters of this place are described as effervescent, slightly alkaline, and ferruginous. The most celebrated spring is known as the St. Leger; it is an excellent table water, being diuretic, aperient and tonic in its action. Douches and baths of all kinds are provided and massage and Swedish gymnastics are also used in the treatment advised for the patients who frequent this spa. From the middle of June to the middle of September is the time for sending people to this place, which is enlivened by a well-managed casino and other attractions.

The visit of medical men ended at Pougues and the termination of a very pleasant tour was marked by a farewell luncheon, at the conclusion of which appropriate speeches were delivered by medical men representing the different nationalities of Europe, especial praise being accorded to Dr. Carron de la Carrière, of Paris, for his untiring zeal and never-failing courtesy.

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SOME POINTS IN THE DIAGNOSIS AND TREATMENT OF COMMON TUMOURS AND SWELLINGS OF THE BREAST.*

By A. MARMADUKE SHEILD, M.B., F.R.C.S.,
Surgeon to St. George's Hospital; Consulting Surgeon to the Hospital for Women and Children, Waterloo Bridge Road, S.W., and to the Hospital of St. John and St. Elizabeth.

GENTLEMEN,—The subject of tumours of the breast is so large, so intricate, so important, so bristling with difficulties of diagnosis and treatment of all kinds, that it would be quite impossible, nay, even unwise, to attempt in a short address, such as I have the honour of delivering this evening, to attempt to deal with the matter thoroughly or in detail. I opine that what would suit my audience the best, what they desire most, what would be of utility, would be for me to bring into prominence the main and important features of the more common breast tumours, to dwell upon those parts of the subject which are most often coming before us, in the daily routine of practice, rather than to try and elucidate obscure pathological doctrines, or describe tumours of rarity and curiosity. Thus the omission of tuberculous and syphilitic tumours of the mamma, of hydatid cysts, galactoceles, and morbid swellings will be accounted for.

There are, perhaps, few subjects of greater surgical interest, and importance to the practitioner than tumours of the breast. They are very common. Sooner or later every one of us has to pronounce opinions of diagnosis and treatment on one of these cases. The greatest alarm and concern is naturally enough manifested about them by members of the public. They often first come under the notice of the family doctor, and if he is unwise or injudicious in his remarks, and if his opinions are afterwards reversed, the greatest complications and unpleasantness are too often

* An address delivered before the Brixton Medical Society.

produced. For these and like reasons the remarks I shall make to-night, brief and imperfect as they may be, will, I feel sure, not be devoid of utility and interest to us all. I beg of you to supplement my short and imperfect sketch of a very complex subject with queries and discussions.

If you reflect for a moment upon the peculiar structure and functions of the mammary gland, you will at once see why it should be a favourite site for tumours and swellings. Its countless systems of ducts and glandular tissues, secreting and transmitting milk and serous fluids, make us easily understand why cysts of all kinds should form in the mamma when any of these ducts are pressed upon or obliterated by inflammatory processes. The ever-changing, extensive areas of glandular proliferating epithelium, the numerous causes of irritation, inflammation, physiological or actually mechanical, lead us easily to understand the terrible frequency of carcinoma. Inflammation of the chronic, subacute, or acute type produces its local effects, while the formations of tubercle and syphilis are not unknown.

A word may now be introduced regarding the method of examination of a mammary tumour.

A most careful inspection should be made of the part. Any puckering of the skin, retraction of the nipple, or discoloration of the integument, with enlargement of the veins, should at once engage attention. The pectoral region and the root of the neck should be critically inspected, and the good and sure rule of comparing the healthy with the affected side should not be neglected. The patient should recline in a good light, and the surgeon should examine the swelling with the flat of the hand, and never "pinch up" a suspected tumour between the fingers. Inflammatory thickenings of the breast feel exactly like tumours, when "pinched up" between the fingers, and there are few greater causes of erroneous diagnosis in mammary surgery than a failure to appreciate this fact. Conversely, if a surgeon feels a distinct tumour or swelling beneath his fingers "laid flat," this is always something more than mere inflammatory thickening. It may be a cyst, a nodule of cancer. The value of this rule can hardly be overestimated. Then on detection of a real tumour, ask yourself, Is it mobile or fixed? Test this symptom critically. Is the skin free over it? Is it solid or fluid? Are the axillary glands enlarged?

These questions are easy to ask: often how difficult are they to answer! The most vital consequences hang upon absolute accuracy in determining such matters, and here the experience of clinical work comes in. I would especially call your attention to the extraordinary similarity between fluid and solid swellings in the breast. Thick-walled cysts and chronic abscesses, when tightly distended, feel so hard as to deceive anyone into the belief that they are solid tumours; and the number of times the breast has been removed for a small cyst or chronic abscess, will never be known, for such mistakes are readily made, and the surgeon who commits them naturally feels ashamed of so grievous an error. Indeed, I have long ago, in my book on diseases of the breast, laid down an axiom that a deeply-seated hard swelling in the mamma can only be certainly diagnosed and dealt with by exploratory incision. This I believe to be one of the most important rules of practice in mammary surgery. Remember it. It will save you from that most fatal of all practices, "guess diagnosis," and will allow you to avoid giving opinions of the utmost consequence to the patient and yourself on insufficient data. Remember that pain is a most dubious guide. Early cancers are often quite painless. Cysts and chronic abscesses may "throb," "shoot," "burn"; so that you may think they are likely to be cancers.

You will note I use the term "exploratory incision." And this brings me to inveigh very strongly against a practice which is laid down in many text-books, and frequently practised even now by many surgeons of position. I refer to the recommendation to pass a grooved needle or trocar into dubious swellings of the mamma to ascertain if they contain fluid. The mamma is a tender and sensitive organ, and the pushing into it of a needle is painful and most alarming to the majority of women. The instrument, if it reaches a cyst, is exceedingly likely to originate sepsis in the depths of the breast, for it carries infected epithelium on the point of the instrument. If the tissues are thick and indurated about a cyst, the trocar may never penetrate them at all and never reach fluid. You then conclude the swelling is solid, and a serious diagnostic error is perpetrated. The draining off of fluid gives you no exact information as to the nature of the cyst—as to whether it contains growth, for instance, or

not. For these reasons I advise you to expunge from your practice the passing of grooved needles or trocars into deeply seated swellings of the mamma. Exploratory incision enables you to diagnose accurately and treat radically and properly any dubious disease of this organ.

As regards the extensive and complicated question of the diagnosis of breast tumours, the first broad proposition that may be laid down is as follows: A tumour or swelling in the mamma of a young girl, or woman under the age of thirty, is very generally of an innocent nature. The only rare exceptions to this rule are acute rapidly growing cancers or sarcomata. I have met with several such exceptional tumours, and they are marked by rapid and progressive increase, a dusky skin, and great enlargement of the superficial veins. They are usually soft and elastic, and when inflamed may closely simulate abscess. But you will probably never meet with such cases, and I have merely mentioned them in passing for the sake of completeness.

The common innocent tumour of the female breast in young persons is composed of glandular tissue, and is termed an "adenoma," or "fibro-adenoma," because it contains much fibrous and connective tissue as well as glandular substance. These tumours vary from the size of a small nut to a large orange. But they are mobile, slipping about in the breast when the hand is laid flat upon them, like a nut or pea in "a bag." The skin is free over them, not dimpled, the nipple is unaffected, and the glands in the axilla are not enlarged. The patients are often very nervous and frightened about the tumours, and the formations are generally the seat of neuralgic pain, much worse at the time of menstruation. These growths are sometimes multiple and also may be bilateral. You can hardly mistake them for anything else but a mobile cyst or cysts, and the treatment of both affections is identical—removal. These tumours grow; they are always serious mental troubles to the patient. In pregnancy and lactation a fibro-adenoma may become alarming, painful, serious, from its sudden congestion and awakening growth. As age advances, carcinomatous growth has been known to originate in these tumours or in their immediate vicinity. No plaisters, liniments, or "absorbent" remedies are of the least use. The X rays are not beneficial.

Iodine, that universal and useless remedy, is "painted on" in vain. A properly conducted operation is all you can suggest, and if you cover up these tumours with plaisters, you will not succeed either in curing the tumours or in ultimately satisfying your patients.

Fibro-adenomata are easily removed by making a free incision radiating from the nipple, and this incision should divide the capsule of the tumour, which is formed of exuberant glandular mammary tissue. The opening of the capsule of the tumour is of primary importance. The growth then readily shells out of its bed, leaving a smooth cavity deep in the breast. These operations, you will be surprised to hear me state, often give more trouble in healing than removal of the entire organ. Blood and serum readily collect in the cavity, and if any sepsis has been introduced most troublesome deep suppuration may readily ensue. The cavity should be obliterated by being brought together by two rows of sutures. One row of sutures is introduced to the depths of the wound, the other unites the skin only. I always introduce a drainage-tube, and slowly shorten it, day by day. Drainage is of the first importance. Removal of adenomata of the breast is not so simple as it seems, and unless great care is exercised in asepsis an apparently easy case may lead you into subsequent great trouble. A general anæsthetic should be given in these cases. They should never be hurriedly performed under cocaine or eucaine. English women, especially of the upper classes, can seldom bear cutting operations on the breast unless they are quite insensible.

But when an older woman, æt. 40 years or upwards, shows us a tumour, then our real difficulties begin. The typical carcinoma is easy enough to diagnose, and everyone in this room, I take it, too well knows the fixed mass of stony hardness, the dimpled skin, the retracted nipple, and the evidently enlarged axillary glands which make up the features of this disease. But the cases which have long perplexed and troubled me, and will trouble you, are small indefinite tumours deep in the breast. When such tumours are deeply situated in the fat and voluminous breast of a woman of the cancerous age the difficulties are indeed very great. Now, the first question you have to decide is as follows: Is this "hardness" due to an area of chronic inflammation or not?

The answer to this investigation I may enunciate to you. Examine carefully with the flat fingers. If you feel a definite hardness or nodule under the fingers, it will be something more than mere inflammatory thickening. And such a nodule will be either a very early cancer, or a collection of fluid, serous fluid, pus, or inspissated milk, in a firm and thick capsule. If you suspect fluid, press with your forefinger in the swelling, and a sense of elasticity will often thus be elicited in a "lump" previously thought to be quite solid.

Such cases are especially those for exploratory incision, and personally I never will give definite opinions on such dubious growths without this safeguard.

I cannot sufficiently impress upon you the exact similarity between some cysts of the breast and early cancer. While the diagnosis of the acute abscess of lactation is easy, that of chronic abscess is often impossible without incision. As an instance, and only one instance out of many, of the extraordinary difficulties which beset the diagnosis of these cases I may refer to the following. Last year I saw a single lady æt. about 50 years, who had a small hard "lump" the size of a hazel-nut deep in the breast. As is usual, she had sought many opinions, and, as is also usual, great differences of opinion were manifest among the hospital surgeons who had seen her case. The majority were in favour of the formation being cancer. I believed the little swelling to be a cyst. It was far more painful than is usual in early cancer, it varied in size, and once there had been a discharge of fluid from the nipple. Moreover on deep pressure with the finger a sense of elasticity could plainly be detected. On exploratory incision a thick-walled cyst, the size of a hazel-nut, containing greenish fluid, was found. On dissecting out the cyst, I was struck with the hardness and induration of the tissues round it, and the impression growing upon me that the breast was here in a state of chronic inflammation, if not worse, I removed the whole organ. Close to the cyst was a nodule of cancer the size of an almond, with the well-known radiating fibres and hard "pear-like" cut surface. Such a case eloquently speaks to us of how unwise it is to give positive opinions regarding these most responsible and difficult cases without exploratory incision, and how even then, one may be led astray. What diagnosis would

have been made in this case if only a *puncture* had been employed?

Thus I dispose of the most difficult consideration in mammary surgery. Remember that when patients find a small hard lump in the breast, they are much alarmed, and you will generally be asked to say positively whether it is cancer or not. The temptation is great to say, "It is only a little lump," "It is nothing; leave it alone," "Paint it with iodine," and so on. But remember, if the "little lump" is by chance the early beginning of a cancer, you are allowing the golden months to slip by when operation is of such incalculable value, and will bear the inevitable reproach for delay of operation when the disease has made serious progress.

Most practitioners lay great stress on the question of enlargement of the axillary glands as a diagnostic point in cancer. Having some years ago taken great pains in investigating this subject, I may positively tell you that the axillary glands are infected in all cases of cancer of the breast. The cancerous deposits are indeed only microscopical in early cases, but they are surely there, and yet the glands deep beneath the fascia and fat of the axilla may not be in the least perceptible to touch or feeling. Enlarged and hard lymphatic glands readily felt in the axilla are indeed found associated with marked cancer of the breast, such as there can be no doubt about! But in small indefinite tumours the fact that you cannot feel enlarged glands goes no way to prove the disease is not cancerous. It is only when the glands are seriously infected that you can feel them. I beg your earnest consideration of this very important point.

Chronic mastitis is an affection which will give you great trouble. This affection is found in its most typical aspect in elderly spinsters who are pale and anæmic, and who not infrequently suffer from uterine or ovarian symptoms of vague pains and discharges for which they get little relief. But I have also seen the affection in married women. Severe neuralgic pains are complained of, and the fear of cancer is often very marked. The tender irregularly indurated breast is very typical. Apparent tumours and thickenings are easily perceptible on taking the mammary substance between the fingers, but on careful palpation with the flat of the finger, these "melt away" and you

realise that no distinct tumour can be felt. The diagnosis between chronic mastitis and carcinoma of the infiltrating variety is, however, so difficult that, after many years of experience, I always approach these cases with the extremes of caution, for errors are only too easily made.

The treatment of chronic mastitis is always most troublesome. Well-conducted bandaging of the breast, with mercurial applications, will do wonders, and the free administration of iron and quinine with iodides is often beneficial. Many cases of chronic mastitis are associated with cysts in the breast. This is due to inflammatory obstruction of the smaller ducts. The cysts are often multiple and troublesome. I have no doubt that removal of the mamma is quite the best treatment in mastitis with multiple cysts. Removal of the breast is also indicated in all inveterate cases of chronic mastitis, especially if there be one or more hard, indefinite patches of induration, difficult to diagnose from cancer. Knowing how often cancer arises in the areas of chronic irritation, I am sure this advice is sound, but it is seldom acted upon.

You have heard me refer to the frequency of cysts in the breast, and I have laid stress on the important similarity between cysts and solid tumours and how often grave errors of diagnosis are here made. The subject of cysts of the breast is a very large one; I cannot enter into it fully. But consider the following remarks.

Cysts of the breast vary in size. One day they are tense and painful, hard, feeling exactly like nodules of cancer; the next day they are softer, more flaccid, less evident and painful. A tumour of the mamma which thus varies must almost certainly be a cyst. Firm pressure with the pulp of the index finger generally starts a sense of *elasticity* or yielding. Frequently the cyst partly empties itself by the nipple. Thus serous or bloody fluids stain the linen, and often cause serious alarm to the patient.

When cysts are multiple throughout the breast, when the mammary gland is riddled and honey-combed with cystic cavities, I feel sure amputation is the best treatment. It is with single cysts that difficulties arise. Given a single cyst of the breast the size of a pigeon's egg, you never can be sure of the condition of its walls. These cysts frequently have papillary growths on the walls, and if they

are injected or irritated the growth is stimulated to serious increase. For this reason, I always prefer the practice of dissecting these formations out entirely. The operations are not easy. The cyst may lie deep in indurated breast substance, which has freely to be cut away. A deep irregular cavity is left, difficult to approximate, filled with blood and serum. Unless very careful asepsis and drainage is carried out, a great trouble in the healing process may ensue. In fact, I am in the habit of teaching students that the healing of the cavity left after excision of a cyst of the breast is more difficult to heal than the extensive wound left after removal of the entire gland.

Great difficulties arise in the consideration of the proper treatment of cysts associated with solid growth. When the solid growth is in preponderance, the cysts being merely part of a large soft solid tumour, the rule of practice is obvious and easy. Such cysts contain bloody or glairy colloidal fluids, and are generally due to hæmorrhage, or mucoid degeneration in soft sarcomatous or cancerous tumours. But when a mammary cyst has merely flimsy papillary growth on its walls how are we to act? Here I am sure of my ground when I state that removal of the entire breast is the safest practice to follow if the growth be at all abundant or if it infiltrates the walls of the cyst.

Old galactoceles or chronic abscesses are particularly likely to be mistaken for cancer, unless explored by incision. Excision of the whole sac in either case is very needful, and the cavities left should be long and carefully drained.

I have thus tried to give you a short sketch of some of the principal difficulties we encounter in the diagnosis of mammary tumours and swellings. The more rare maladies I have purposely not even touched upon. It now only remains for me to conclude by speaking of the proper treatment for mammary cancer, which, after all, is of the gravest interest in connection with the subject of mammary disease.

(1) Remember the supreme importance of early action and diagnosis. Never cover up a tumour of the breast with plaisters or paint it with iodine, until the day for early operation is passed.

(2) In more advanced cases the necessity for operation is more obvious.

(3) In cases where the skin is much involved, and where the tumour is fixed to the chest walls,

with glandular infection stretching into the root of the neck, operations are seldom of utility.

The modern operation for mammary cancer, I fear, is seldom properly carried out. Knowing as I do that glandular contamination occurs very early and insidiously in cancer of the breast, I strongly hold that the whole lymphoid area of the axilla should be removed in every case from the clavicle downwards, the axillary vein being stripped bare. In many cases the sternal part of the pectoralis major should also be removed, and this gives the freest access to the axilla and glands. I usually adopt this method.

This operation is extensive and not easy to do. I fear that the term "recurrence in the axilla" is often not a correct one. It is not a return of the disease, but manifestations of the growth which the operator has never really removed at the first operation. In fact, he has closed the wound, leaving infected tissues in abundance undisturbed. This is a very grave consideration, and I do not hesitate to say is *the* "weak point" in the mammary surgery of inexperienced operators. This leaving behind of infected tissue in the axilla is largely the cause of the gloomy prognosis generally given in these cases by the public. May I urge this consideration very strongly upon you? Very free removal of skin and pectoral fascia is also essential, and if glandular contamination is at all marked I always remove the entire sternal pectoral as well. In all breast cases I insert two large drains, one in the axilla, the other in the centre of the sternal part of the wound. I regard this second tube as very important. I never bind the arm to the side after operation, but let it recline on a pillow; and in fourteen days the nurse gently begins to move the shoulder; this prevents the subsequent troublesome axillary contraction.

The general anæsthetic gas and ether followed by chloroform. I regard prolonged etherisation in these cases as dangerous and apt to cause subsequent serious bronchitis, especially in fat and aged women. I am sure this point is a very vital one. For the same reason rapidity in operating is of great importance. A feeble elderly woman who is kept under anæsthetics partly exposed on a table for an hour and a half to two hours has a much worse prospect of recovery than one who is back in bed within the hour. The latter time is

ample for any breast operation of whatever magnitude.

We all differ as to the capabilities of surgery, and one man will undertake a case another will not touch. I have several times operated upon advanced cancers of the breast mainly to avoid fungation and discharge, but with no hope of cure.

I may generalise by pointing out to you types of cases where operations are very unsatisfactory:

(1) The acute infiltrating cancer in pregnancy, with brawny infiltration of the skin.

(2) Glandular infection of the axilla and neck, with œdema of the arm.

(3) Marked infection of the skin of the thorax, with or without evidence of visceral deposits.

The results of properly operating on cancers of the breast are astonishingly good. Numbers of cases are found seeming well and free from disease many years after operation. I have quite a number now who are well five to eight years after operation. On the other hand, I have met with cases which have done very badly. Rapid return and disappointment to all concerned have eventuated. I fear this experience is common to all truthful operating surgeons.

You will be asking the question, Of what efficacy is other than operative treatment in cancer of the breast? I have seen the X-rays relieve pain and cause the disappearance of nodules. I have seen superficial ulcerations temporarily heal. But I have never seen a case cured. Dermatitis from the remedy is a most serious evil, and great care must be taken in the application of the X rays lest this disaster happen. Spontaneous atrophy, "withering cancer" is a phenomenon seen sometimes in the natural history of these growths.

The curious pathological vagaries of cancer are not generally appreciated or understood by the profession, and hence any remedy given at the time a beneficial pathological change occurs has the credit of working a marvellous cure! Thus are explained the retrogression of cancers under "violet leaves," "cinnamon bark" or "Christian science"! But indeed the remedies used for cancer are too numerous to enter into at this late hour. They are often employed in perfect faith by medical men who lack shrewd judgment, by patients ready to snatch at the "last straw" of hope. They are all constantly being brought under my notice, and from actual experience I think I can truthfully answer any question you like to put to me concerning them.

A CLINICAL LECTURE

Delivered at St. Bartholomew's Hospital.

By **W. P. HERRINGHAM, M.D., F.R.C.P.,**

Physician to the Hospital.

GENTLEMEN,—In many cases which come into the wards you will find the principal symptoms of importance are anæmia and enlargement of the spleen. Now, these cases are not by any means always of the same character, and as the diagnosis, when I was your age, used to puzzle me a great deal, so I think it will be useful to group some of them together and consider the various points. We had a case in my wards just lately, and some of you will remember it very well. The man was an Italian, æt. 49 years, and he said that for four months he had been short of breath, for two months he had been losing flesh, and for three weeks he had had pain in his left side, which was worse when he was up and when he coughed. There was nothing particular to say about the rest of him, but when we came to his abdomen we found that his liver was two inches below his ribs—that is to say, it was considerably enlarged—and that his spleen was about one inch below the ribs. I have said he was an Italian, with a dark skin, and it is of course rather difficult to detect anæmia in people of that complexion. But we thought he certainly was considerably anæmic. In a case of anæmia with enlarged spleen the very first thing to be done after you have made your general examination is to examine the blood. We know exceedingly little about the physiology and pathology of the spleen, very little indeed. But what little we do know points unmistakably to its connection with the constitution of the blood. You probably know that if experimentally you transfuse blood through the spleen you lose thereby a great number of the leucocytes, as they break up in the spleen. That that can be an end in itself one can hardly suppose, but it may be a means to another end; and what that end may be is, I think, indicated a little by another fact, a pathological fact. The spleen is enlarged in a great many infectious diseases. The commonest things of the kind enlarging the spleen which we see here are typhoid fever and pneumonia, though of course the classical instance is malaria. Now, I always think

that the enlargement of the spleen in these cases is comparable to the enlargement of the lymphatic glands when you have a cut or a septic wound in the hand. I imagine it to be the result of a process of resistance to the introduction of poison into the blood. I suppose there can be no doubt that the lymphatic glands are the first barrier against invasion of pathogenic microbes from the surface, and I think in the same way the spleen forms the battleground between the cells of the blood and the poison introduced in other ways, and the result of that is the enlargement of the glands and of the spleen respectively. In such diseases as typhoid, pneumonia, and malaria it seems to me that the destruction of the leucocytes may be playing a part; these leucocytes may be sacrificing themselves to preserve the organism. For those reasons always examine the blood as the first step when the spleen is enlarged in a case of anæmia. We did so, of course, in this man's case, and we found the great and important fact that he had an enormous leucocytosis. His white cells were 399,000 in the c.mm., whereas you know they should be about 7000. There is no disease in which that occurs except one, or I should say one group of diseases—those diseases, which go by the name of leukæmia or leucocythæmia. We further found, on examining these white cells more particularly, that a very large part of them, about 30 or 40 per cent., were made up of cells wholly foreign to the blood—that is to say, cells which never occur in the natural blood, cells which resemble in one way the large lymphocytes—I am speaking to people who know all about the blood—in that they have a large single nucleus, which resemble the polymorphonuclear leucocytes in that they have a granular cytoplasm. They are quite different from the large lymphocytes, because they are granular; they are quite different from the polymorphonuclear leucocytes because their nucleus is a large single one. The polymorphonuclear leucocyte, when it is stained in the ordinary way, has a "wriggley" nucleus; a large lymphocyte has a single nucleus, which fills almost the whole cell, so that there is little cytoplasm around it, and this part of the cell outside the nucleus is plain, and has no spot on it at all. The myelocytes have this part all granular. Those are the distinctions between them and the other cells of the blood. These cells occur in small proportions in many forms of anæmia, but they never occur

in such large quantities save in one form of leucocythæmia, and that is called the spleno-medullary form. We found that this man had a large spleen, and in the second place, we found that he had tenderness over the sternum. As you know very well, in spleno-medullary leucocythæmia it is supposed that from the red marrow of the bones—which is usually greatly altered, for instead of being red it looks almost like pus—these cells, which are natural to the red marrow, in some way escape into the blood.

You may get an enormous increase of leucocytes in another form of leucocythæmia, namely, in the lymphatic form; and in that form, again, the spleen will be enlarged, though usually not so much enlarged as in the spleno-medullary form, and there will be enlargement of the lymphatic glands all over the body. Cases of lymphatic leucocythæmia are much less common than cases of the spleno-medullary form. I have seen dozens of cases of the spleno-medullary form here, but I cannot at this moment recall having seen more than two or three instances of the lymphatic form. And the blood is not the same. In the lymphatic form the increase is nearly entirely due to the lymphocytes, either the large form which I have drawn with a plain cytoplasm, or the little form no bigger than an ordinary little red blood-cell. There are very few of the foreign bodies known as myelocytes.

Both these forms are usually chronic, as this man's was. His case was insidious; he gradually got weaker; he gradually got a little paler; there was gradual pain in his left side. But there are cases in which the whole thing comes on suddenly and rapidly, more like a case of typhoid fever than anything else, and those are always lymphatic cases. They are called acute leucocythæmia and they usually begin with profound weakness, a rapid enlargement of the glands and spongy and bleeding gums, and at the first sight you cannot think what they are. It is the last thing you think of that they should be leucocythæmic. You probably think the case to be one of some septic disease. But when you come to examine the blood you find there is an enormous increase of leucocytes such as occurs only in leucocythæmia, and the patients die of the disease in about six weeks. Cases such as my patient either recover, at any rate for a time, as he done, or the case lasts longer.

When this man first came in he had 399,000,

white cells in the cubic millimetre; twelve days afterwards he had only 320,000; a week later he had only 113,000, and a week after that he had only 22,000 white cells. So he mended more rapidly than you would have conceived possible when you saw him. But his spleen remained exactly the same size. He improved under arsenic, and one of the great points of resemblance which makes all these diseases so puzzling is that arsenic has the same curative effect in any one of them; there is nothing else that does them any good and arsenic does them all good. He had a very large liver, and it did not decrease any more than his spleen did: it increased rather than decreased. And the liver in these cases is often very large, and that enlargement is entirely due to infiltration with these leucocytes. Much the same condition occurs both in the liver and in the spleen.

Now, let me tell you another case. Some ten or twelve years ago a young man was admitted when I was Registrar into Colston Ward. He was æt. 23 years, and was admitted for ague. He told us he had had ague attacks during the previous week. He had an enlarged spleen, and was profoundly anæmic, so he was admitted without further question as a case of ague; but when we came to look at him and ask him more about his symptoms we found that these attacks of ague had occurred three times every day—namely at seven o'clock, eleven o'clock, and again in the afternoon; that is, of course, impossible in ague; it never occurs in that disease. We further found that he had never been out of England, and had never lived anywhere except at Bognor and other places, which were equally free from malaria. He had done his work up to the time of his admission to us, and was going on to take another place as footman, so you may judge that he did not feel particularly ill. On asking him I found that he had been admitted into Great Ormond Street Children's Hospital when he was eight years of age, for enlarged spleen, and that he had been in several hospitals since then. The impression I formed from his behaviour and conversation was that he was an instance of what we call an old hospital bird—that he knew he was welcome at any hospital because of the interest of his symptoms, and that he was merely putting in a quiet and cheap time between one place and taking up another, for which he had already engaged himself. In his case, of course, we naturally thought, as his history was

not that of ague, and as when we examined his blood there was no plasmodium of malaria in it, that he had leucocythæmia, and that was the diagnosis which had attended his career at every hospital where he had been. Eight years from twenty-three is fifteen, and he came to us in 1893, so he began his hospital work in 1878; and at that time, and for many years afterwards, up to 1893 almost, very little was known about the blood; we were not so skilful as all of you are now; we could not tell the difference between one leucocyte and another, and we did not examine the blood, as you do, with those beautiful stains which show up the various tissues and cells which I tried to describe to you when I talked of the cells of the blood. The diagnosis of leucocythæmia was naturally made. However, we examined his blood and found that he had no leucocytosis, and not only that, but he had fewer white cells in his blood than natural. He suffered from what is now known as leucopenia. This was a great puzzle to me then, because there was little known about it in English literature at that time, and I did not happen to have read the records of foreign work on the subject. It had been known in foreign countries for some years. The Germans had called it "pseudo-leukæmia," the French called it "spleno-megalie primitive," and an Italian professor, Banti, of Florence, had written a paper on some cases of this sort, beginning with anæmia and enlarged spleen and without leucocytosis, which subsequently developed a fresh train of symptoms. In later years he found that some of these cases had ascites and cirrhosis of the liver, and a peculiar jaundice or bronzing of the skin. That is known as Banti's disease, and it is the last stage of some cases of spleno-megalie primitive, or pseudo-leukæmia, or, as we call it, the splenic anæmia of adults. Three years later Dr. Samuel West described a case which occurred here in this hospital, and you will find it recorded in the 'Medico-Chirurgical Transactions' for 1896, under the name of "splenic anæmia"; and the disease goes now by that name in English literature. Those cases are now very well known. We know first of all that they are very chronic diseases, whereas of leucocythæmias those which do not recover nearly all die within five years; the condition rarely lasts beyond that time, and the duration is usually not so long. This young man's case with splenic anæmia had

already lasted, when we saw him, fifteen years, for no doubt the disease was the same all through since eight years of age. Many are known to last even longer than that. Of course they do not all last so long, but it is a very chronic disease and is compatible with comparatively good health; that is to say, the people do not complain of their symptoms; they do not seem to feel very ill, but they look anæmic. Many of them go about their work as usual. And further, it is characterised by one very curious symptom, and that is a great tendency to hæmorrhages. Hæmorrhages occur in all blood diseases, but this particular form of very great enlargement of spleen with anæmia and without leucocytosis is peculiarly liable to hæmorrhages, such as hæmoptysis, bleeding from the gums, and especially profuse hæmatemesis, from which they often die. Some of them, as I have said, go on to the condition known as Banti's disease, not all. And it seems quite likely that we are grouping more than one disease under the same name, as I believe to be also the case with leucocythæmia. A very curious thing has been found out about the disease, namely, that some patients can be cured by cutting the spleen out, and that measure has been tried now in a considerable number of cases. A good many of them die, and it is not a measure which one would take, perhaps, except at the last extremity; but a certain proportion of them live and are cured of their symptoms by the resection of the spleen. So there is one class of case in which you find great leucocytosis, and a second class in which there is none.

There is another set of cases which occur in little children. Perhaps it does not lead to much confusion, but it is well to mention it here. These children are usually under two years of age. They have a very large spleen, nearly always purpura, sometimes bleeding from other parts, and considerable increase of leucocytes in the blood. One of the cases we have in the museum, of which this is the spleen, had 78,000 leucocytes, and of these leucocytes a certain proportion are myelocytes. This particular condition, "the splenic anæmia of infants," as some people call it, or "anæmia pseudo-leukæmica infantum," as others call it, is at present the subject of dispute. It is not a very uncommon disease; you will probably see some cases while you are in the wards. It is a disease from which children usually recover, though not always; and

the question is, Is it a disease by itself, or is it merely the ordinary anæmia of infants produced by various causes? It so happens that in the last volume of the Pathological Society's 'Transactions' there are two excellent papers, both of them written by members of our teaching staff: Dr. Rivière wrote one, and Dr. Drysdale and Dr. Thursfield wrote the other. And there is another interesting thing about it, and that is that they take diametrically opposite views on the matter. Dr. Rivière declares that this condition is merely the ordinary anæmia of infants, which may be produced by anything, such as rickets, broncho-pneumonia, tubercle, and in very many ways. Dr. Drysdale and Dr. Thursfield declare that in many of their cases there was no other disease to produce anæmia, and that it is a disease *sui generis*. Whatever the results in public opinion may be, these two papers will undoubtedly form some of the great standing evidence by which public opinion will be formed.

These, then, are three cases in which the anæmia and enlargement of the spleen are the only symptoms. But there is another class of cases which may very likely lead to mistake, and that is the disease which produced that spleen (specimen shown), namely, lymphadenoma, the "hard-bake" spleen of lymphadenoma. I told you that in lymphatic leucocythæmia you get a large spleen and enlargement of lymphatic glands all over the body. Precisely the same thing happens in lymphadenoma. There, as you probably know, the first thing which is generally felt and complained of is enlargement of glands in the posterior triangle of the neck. It goes on to the other triangle of the neck, or to the axilla, and eventually to the groins. The deep glands in the thorax also get involved, which you can tell by percussion and by pressure symptoms. The glands in the abdomen may be enlarged, which you can tell by palpation, and with that very often comes a considerable enlargement of the spleen. It is hardly ever so large as this, which is from a case of spleno-medullary leucocythæmia. But it may be as large, for instance, as the spleen of the Italian patient I have told you of—that is to say, one inch below the ribs. When you get a case of enlargement of the lymphatic glands, which you can see and feel all over the body, and enlargement of the spleen, with anæmia—for they are all anæmic—you are puzzled to say whether it is lymphadenoma or the lymphatic form of leucocythæmia, or lymph-

æmia, as it is called, until you examine the blood. It is the examination of the blood which enables you to distinguish the two. In the lymphæmia you get enormous leucocytosis; in Hodgkin's disease or lymphadenoma you do not.

All these four diseases—leucocythæmia, splenic anæmia, the splenic anæmia of infants and Hodgkin's disease—are alike in this: they are all anæmic; they are all of them intermittently febrile; they are all accompanied with prostration and weakness: all of them, as I have already told you, are improved and relieved by arsenic; and three of them, at any rate, lead to death. It is only in the examination of the blood that you can tell the difference. Yet, the pathology seems to be quite different. This lymphadenoma is a definite growth; it is a metastatic growth which occurs in every organ of the body. These leucocythæmias and splenic anæmias must be something of a poisonous nature. There must be something which produces the enormous change in the blood characteristic of leucocythæmia, which has been called, as you probably know, sarcoma of the blood, because the blood-cells increase abnormally, and are found in abnormal places, and because the blood is a mesoblastic tissue like sarcoma. I do not think it is a good name, and that seems to be the wrong view to take of it. It must be the result of some poison, and the effort on the part of the organism to resist that poison is the cause of the condition.

There is another difference between leucocythæmia and the splenic anæmia of adults. Of the latter I cannot show you a specimen because it is so rare; we have only had one death from it here in this hospital, and that was Dr. West's case, and for some reason that is not to be found; whereas I could have shown you many of leucocythæmia. The difference that I mean is in their morbid anatomy. The spleen of splenic anæmia is a curious thing. In the first place, it is cirrhotic or sclerotic; that is to say, there is a great increase of fibrous tissue, and the special tissue of the spleen is atrophied. And in the second place the blood sinuses are lined by great endothelial cells, and so some cases have been described as endothelioma of the spleen. Those peculiarities do not occur in leucocythæmia. Each of them may be found separately in other conditions, but the three are not found together except in splenic anæmia.

Those are the four diseases which you are likely to

confound together; but there are one or two other cases, and I have mentioned one already, malaria, in which there is profound anæmia and enlargement of the spleen, but the blood examination shows you the plasmodium of malaria and clears up the diagnosis, and the clinical history clears it up also, almost equally well. Here is another case of enlargement of the spleen from gumma; it is a syphilitic spleen with a large gumma in it. The history of the case could hardly be obtained because the patient only lived a few days, and was unable to give an account of himself when he came. Here, again, is another spleen, very large, from a simple case of cirrhosis of the liver. There was nothing the matter with her but cirrhosis of the liver, but you can see the size of her spleen. Here is another specimen, which is from a child, and it is very large for a child. It is curiously like the lymphadenomatous spleen, but it is full, not of lymphadenoma, but of tubercle. There are many causes, therefore, of enlargement of the spleen, but the four great causes which are apt to be confused and which are apt to confuse you are leucocythæmia, splenic anæmia, the splenic anæmia of infants, and Hodgkin's disease, and the diagnosis of these turns almost entirely on the examination of the blood.

A LECTURE

ON

TRAUMATIC NEURASTHENIA.*

By DONALD ARMOUR, M.B., M.R.C.P., F.R.C.S.,

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LADIES AND GENTLEMEN,—I propose devoting such time as I have to the discussion of that form of injury which has been called by Erichsen "railway spine," and again renamed with more appropriateness "railway brain," and upon which so much light has been thrown by Horsley, Page, and Thorburn in this country; by Weir-Mitchell, Dana, and Putnam in America; by Charcot and his pupils in France; and by Oppenheim, Strümpel, and others in Germany. I now take the

opportunity of acknowledging my indebtedness to these authors in the preparation of this lecture.

I have spoken of "railway spine" as a form of injury. It would be more accurate to speak of it as a train of symptoms following as a result—usually more or less delayed—of the great mental disturbance and nervous shock which are caused by a railway accident. Formerly the injury received was vaguely described as "concussion of the spine" and the subsequent symptoms were ascribed to a resulting meningo-myelitis of the brain and spinal cord. This was largely due to the fact that often some form of injury to extra-spinal muscular and ligamentous structures was present and thus gave rise to the mistaken notion that the nervous symptoms were due to a lesion in the spinal cord. This theory has now been abandoned. Before passing on to the consideration of these nervous symptoms proper it will be as well to consider briefly the more common injuries to the back received in railway and other accidents, and to see wherein lies their resemblance to the more severe injuries and how they are to be distinguished. This usually takes the form of a sprain to the whole or to some part of the vertebral column. It is due as a rule to the sudden stopping of the train, which jerks the traveller forward in his seat, or throws him on the floor. Both consciously and unconsciously the vertebral column, with all its muscles, ligaments and articulations, is thrown into sudden action to protect the spinal cord. Some ligaments and muscular attachments are overstretched, strained or even ruptured—usually in the dorso-lumbar or lumbo-sacral region—giving rise to what Page has so aptly described as "traumatic lumbago." On examination there is no external sign of injury, but the patient cannot stoop, holds his back stiff, and has difficulty in rising from his seat. Added to this there may be local tenderness in the muscles on either side of the vertebræ. This injury varies in severity, and pain may be referred to an altogether different part of the vertebral column.

The three most prominent and distinctive signs of simple sprain of the back are stiffness, pain, and tenderness, without acceleration of pulse, rise of temperature, or peripheral pain. The pain may be acute at the time of the accident or come on acutely some hours after. Or, again, it may pass into a constant dull aching, lasting some weeks,

* Delivered at the Medical Graduates' College and Polyclinic.

which may be rendered acute by movement, seizing the patient so suddenly and sharply as to prevent movement of any kind. It may be felt throughout the whole spine or be confined to one part of it. The pain and stiffness are prone to last a long time, to recur from time to time, and to be affected by change in the weather or by exertion. Superadded to this pain there is sometimes a condition of hyperæsthesia of the surface. More especially is this the case if frequent examinations of the back have been made. This hyperæsthesia has two distinct characters which separate it from that due to sensory nerve-root irritation, or actual cord disease; it is too widespread over one area, and it is too limited to the seat of attention. Again, the readiness with which the patient's attention can be diverted from his back is of great diagnostic importance. The tenderness is felt on pressure over one or more spinous processes or extending to a wider area on each side of the spine. This tenderness, while a more or less inevitable consequence of the injury, must not be regarded by itself as a grave symptom. "Tenderness by itself is not to be regarded as an indication of grave injury to the contents of the spinal column; it is a symptom which, if of any value at all, ought rather to reassure, as pointing to the kind of injury which we are here considering" (Page). Buzzard says that if we put aside caries, in which the vertebral column itself is diseased, we shall find that the existence of very marked spinal tenderness points strongly in the direction of a functional nervous affection of comparatively little importance, and does not indicate a serious organic lesion of the spinal cord. The pain on movement may be so great as to give rise to a spurious paralysis, due to the patient's fear of moving. He has a feeling of weakness in his legs, says that his legs give way under him and that he cannot walk. That these results are due to the fear of moving is well shown in a case recorded by Page of a man who had received just such an injury as we have described and who needed three persons to help him out of bed to pass water in the daytime, and yet who, whenever he awoke in the night, could jump up naturally out of bed without any help for the same purpose. This pseudo-paralysis may give rise to a needless alarm and a wrong prognosis, if unrecognised, more especially if it is accompanied by real difficulty in micturition, irritability of the

bladder, and cystitis. The difficulty in micturition, due to either posture or to the lumbar muscles being thrown out of use, may lead to retention-incontinence and the urine dribbles away. Cystitis is set up by decomposition of residual urine, thus giving rise to a symptom group which we are in the habit of associating with grave injury or disease of the spinal cord. This symptom group is not, of course, peculiar to spinal injuries received in railway accidents. The same symptoms follow spinal sprain from whatever cause. Their importance in railway accidents is due to the possible accompaniment of other disturbances—functional, emotional and hysterical—which have been looked upon as the result of injury to the spinal cord itself, and are such a fruitful source of legal proceedings that they have been called "litigation symptoms." Yet these same symptoms are seen when no injury has been inflicted and without a blow having been received on any part of the body. They are due to the fright and mental shock incident to railway accidents, are symptoms of severe general nervous shock, and "are the continued expression of severe nervous exhaustion." "Picture a case of this kind, and add to it sprain of the muscles and ligaments of the vertebral column, with the resultant pain on movement, so obstinate in its duration and the tenderness—sometimes acute—on touch, and it is neither more nor less than natural, though a natural mistake, that the whole condition should be attributed to some alteration or morbid change of the spine and spinal cord which have been concussed" (Page).

It is to this class of case that I wish more particularly to devote myself—nervous affections of traumatic origin, without any organic basis and of more or less ill-defined symptoms, described under such terms as "shock" "concussion," "neurasthenia," and "hysteria"; or, as Page describes them, cases of which "the course, history, and general symptoms indicate some functional or dynamic disturbance of the nervous equilibrium or tone, rather than structural damage to any organ of the body."

Various classifications have been made of these cases. Oppenheim speaks of "traumatic neuroses or neuropsychoses." Strümpel divides them into "general traumatic neuroses," which include the neurasthenic symptoms; and "local traumatic neuroses," which are purely manifestations of

hysteria. Bernhardt includes them under three classes—(1) those with symptoms of probable organic origin, (2) those of hysteria or hysterio-epilepsy, (3) those without definite symptoms beyond a feeling of weakness, malaise, and inability to work. Cenas describes the results of railway accidents as (1) meningo-myelitis and meningo-encephalitis, (2) hysteria, (3) neurasthenia. Thorburn, whom it will be most convenient to follow, classifies the post-traumatic functional neuroses as follows:

(1) Acute effects:

(a) General nervous depression—"shock," or "collapse."

(b) A more localised and defined disturbance of cerebral (cortical) origin—"acute hysteria" or "hysterics."

(2) Chronic after-effects.

(a) General nervous depression—"neurasthenia."

(b) A more localised and defined disturbance of cerebral (cortical) origin—"chronic hysteria."

"Shock" and "collapse" are almost synonymous terms, the meanings of which are well recognised and fairly definite. The essential phenomenon of shock is a diminution of blood-pressure, due to exhaustion, rather than to structural lesions, of the cardiac muscle, of the cardiac centres, of the blood-vessels, or of the vaso-motor centres. Crile concludes from his experiments that shock is an exhaustion or break-down of the vaso-motor centres. Collapse is applied to the cases of more sudden fall of blood-pressure, "due to a suspension of function of the cardiac or of the vaso-motor mechanism or to hæmorrhage, rather than to exhaustion of the centres" (Crile).

Clinically shock and collapse are evidenced by a small, feeble, or almost imperceptible pulse, pallor and coldness of the lips and limbs, mental dulness, relaxation of sphincters, lessened secretion of urine—in fact, a general lowering of vitality of the whole body. Shock is an immediate result of sudden and severe injury, however inflicted, and may be lasting and profound, even ending in death, or it may be slight and transient. It is easily recognised and so familiar to you all that we need spend no more time in its discussion.

Acute hysteria, or "hysterics," differs from the more defined and durable forms of hysteria in that it is merely a manifestation of a short-lived excitement without serious symptoms and is soon

over. It is characterised by screaming, crying, laughing, or possibly convulsions. This form is familiar to everyone. Thorburn refers, however, to another aspect of acute hysteria in which the victims of railway accidents pass through a more or less brief stage of so-called unconsciousness—quite different, however, from the unconsciousness of concussion. He thus describes it: "The condition is rather one of general obliquity to external impressions, in which many voluntary acts are performed almost automatically, the higher mental faculties alone being in abeyance. Such a state resembles much more closely the hypnotic condition. The injured person may get up and walk away, taking little or no notice of his surroundings, acting as in a dream, and perhaps only coming to himself after a considerable interval, and at some distance from the scene of his accident." The symptoms, like those of the preceding form, are of not long duration, nor usually followed by anything more severe. Although described by this author as "acute hysteria," we shall see presently that this latter class of cases comes more appropriately under one form of acute traumatic neurasthenia.

Neurasthenia may be briefly defined as a condition of weakness or exhaustion of the nervous system. "It covers an ill-defined, motley group of symptoms, which may be either general and the expression of derangement of the entire system, or local, limited to certain organs" (Osler). It is often spoken of as synonymous with hysteria, from which it should, however, be clearly distinguished. The clinical picture of neurasthenia is thus drawn by Thorburn: "The symptoms arise from a general defect in the nutrition and action of the nervous system, and when they follow an injury, are characterised chiefly by general debility, confusion of thought, loss of memory, mental irritability, disturbed sleep, dreaming, headache (usually posterior), interference with visual accommodation, photophobia, palpitation, frequency of the pulse, dyspeptic troubles (furred tongue, foul breath, constipation, and nausea or epigastric pain), sweating, a concentrated condition of the urine, etc." When this morbid condition follows an accident of any kind it is termed "traumatic neurasthenia." Following traumatism we may find symptoms of neurasthenia, of hysteria, or of both. But while traumatic neurasthenia may be, and frequently is,

combined with true traumatic hysteria, the former is much more common, at all events in this country, than the latter. Of 300 cases of railway accident reported by Thorburn only 25 had hysteria. Horsley divides traumatic neurasthenia into two classes: (1) acute traumatic neurasthenia, a small class of cases, in which the symptoms begin immediately after the infliction of the cause; (2) chronic traumatic neurasthenia, a much larger class, in which the symptoms come on gradually.

In connection with this class of cases it is important to refer to a "latent period" in the disease to which Horsley has particularly drawn our attention and which is so prone to be misunderstood. He says: "It would seem to be the rule that a period of variable duration should intervene between the incidence of the shock and the first serious manifestations of symptoms, very often between it and the occurrence of the first symptom." This latent period may be one or several weeks in duration and is of value in deciding upon the genuineness of the condition. A person suffering from acute traumatic neurasthenia may present himself either in a dazed condition but capable of answering clearly when spoken to, or in a state of restlessness and excitement, akin to an attack of hysterics, but also capable of being recalled to himself; or he may pass from the first condition into the second.

Three predisposing causes may be mentioned in connection with the occurrence of neurasthenia following traumatism: (1) A neurotic family history; (2) previous acute illness, especially influenza and typhoid; (3) nervous exhaustion from overwork, or from excesses of any kind. The symptoms all point to a state of lowered nervous tone and a depression of all the functions of the body. They are best considered under the following heads:

- (a) Alterations in the higher centres.
- (b) Alterations in the lower centres.
 - (1) Sensory conditions.
 - (2) Motor conditions.
 - (3) Condition of organic systems.

Under "alterations in the higher centres" we include the intellect, memory, and emotions. The patient finds small routine matters of everyday life a great effort; the writing of a letter, the concentration of attention on business matters. His intellect is "foggy." He suffers from "weary brain."

Any mental effort brings on frontal headache. He complains of loss of memory, meaning thereby an incapacity for sustained thought or application to work. This may go on even as far as inability to collect his thoughts or to take part in conversation. The patient becomes apprehensive, pessimistic, irritable and hypersensitive. Small incidents give rise to worry and even to tears.

Sleeplessness is one of the most frequent of symptoms in traumatic neurasthenia and may be the cause of the greatest distress. The sleep is broken, irregular, and fitful. Either all sleepiness disappears at once on lying down, or after an hour or two's sleep, the rest of the night is passed in nervous and wretched tossing. Sleep is often accompanied by nightmare and unpleasant dreams.

The three classical forms of *headache* in traumatic neurasthenia are: (1) pain situated at the vertex; (2) pain limited to the area of distribution of the great occipital nerve (posterior primary division of the second cervical nerve); (3) temporal pain, *i.e.* opposite the pterion on each side. The vertex pain is usually described as "pressure," with or without dull aching, and is rarely sharp. It is almost always strictly referred to the bregmatic region, which may feel tender. The second variety is usually referred to the superior curved line of the occipital bone, and is dull aching in character. It may extend down the neck and gives the feeling of a stiff neck. There is tenderness and heat along the course of the great occipital nerve. The temporal pain is nearly always stabbing in character but much less frequent in occurrence than the first two.

The sensory conditions found in traumatic neurasthenia are best discussed under (1) subjective sensations; (2) objective changes.

Subjective sensations.—Very rarely are the senses of smell and taste affected unless there is some actual structural damage. Of vision, the chief is asthenopia. The whole visual field is misty, and concentration of vision induces a sensation of fatigue. A dull aching pain is referred to the back of the eyeballs. Subjective flashes of red or blue light are not uncommon. Photophobia in considerable degree may be complained of. It is usually seen in very severe cases soon after the accident and is generally transient. In connection with audition there are two common sensations, *viz.* a low buzzing sound heard in both ears; and

giddiness, which must be distinguished from true vertigo of aural disease. It is more of a light-headedness, with failure of the power of the legs. Of tactile sensations, numbness, and "pins and needles," usually in the finger-tips or soles of the feet, rarely outside the limbs, are the commonest. These are worse at night or after fatigue. In the upper limb the "pins and needles" usually affects the ulnar side, and in the lower, the antero-external surface of the thigh (external cutaneous nerve.) Subjective sensations of heat and cold may be general or local. In the first, the patient feels cold all over and may shiver; in the second, patches of cold are felt along the spine or in the hands and feet. Muscular sense is only affected in very severe cases accompanied by a large degree of analgesia. Pain has already been referred to in part when speaking of headache. In the upper limb the pain usually follows very fairly the course of the musculo-spiral nerve, and in the lower limb that of the sciatic. In addition there are certain spots first described by Charcot as hysterogenic zones, not only in which pain is felt, but which are also painful on pressure. The chief of these are the region of the first dorsal, the sixth and seventh dorsal, the twelfth dorsal, and first lumbar, the first sacral spines and coccyx; under the left breast; in the abdominal wall over the ovaries; the posterior superior, and sometimes the inferior spine. Anorexia, and a subjective sensation of nausea which may pass into the so-called hysterical vomiting, may be present.

Objective changes.—As in subjective sensations, so in regard to objective changes of taste and smell, it is difficult to exclude possible injury from concussion. In regard to vision, the most important symptom is contraction of the field both for white and coloured light. While it may be bilateral in severe cases, it usually is confined to the side on which there is hemianæsthesia and hemiparesis. This statement is founded on Horsley's large experience. Allbutt states, however, that the visual fields are of normal extent in uncomplicated cases. Changes in the optic discs are exceedingly rare, if ever present. "There is no doubt that the pathological nature of many of the appearances described in these cases has been the result of an affection of the mind of the observer, rather than of the eye observed" (Gowers' 'Med. Ophth.,' 4th ed., 1904). "Simple congestion," "con-

gestion with œdema," and a "slight neuritis," described in these cases, are, according to Gowers, "conditions of doubtful significance." The pupil may be a sluggish, widely dilated one. Of objective audition, the commonest condition is one of hyperacusis, in which the ordinary sounds of everyday life become unbearable from a possible excess of acuteness of hearing. Then, again, there may be a dulness of hearing in severe cases, on the same side as the hemianæsthesia. The tactile sensation and its localisation are occasionally altered, but not in proportion to the subjective sensation of tactility. Appreciation of changes in temperature are so obscured by the condition of the vessels of the part, altered by vaso-constrictor or vaso-dilator influences due to the disease, as to be very difficult to decide upon. Objective pain, *i.e.* tenderness on pressure, can be elicited at spots corresponding to those already referred to as described by Charcot. The pain is of a dull aching character, and can be brought on by muscular action or by sudden jar.

Motor conditions.—These include (1) over-action, seen in tremor, spasms and contractures; (2) defective action, as seen in general paresis; (3) the reflexes.

Tremor is the so-called intention or purposive tremor, accompanying voluntary acts. Observation or agitation increases it. The muscles in traumatic neurasthenia may pass into a condition of spasm when voluntarily contracted and spasm and contracture may occur and persist independently of any voluntary action. The most common seat is in the limbs. General paresis is a very marked symptom of all these cases. This is true of both sudden and continued action. It closely resembles the general paresis of organic lesions of the nervous system. Localised paralysis is usually monoplegic in type, and affects chiefly the lower limbs. The upper limbs are less often affected and the face hardly ever. Richet has pointed out that the left side is affected three times as frequently as the right. The superficial reflexes are almost always heightened. They may be diminished in severe cases, and absent where analgesia has been established. The first and most common stage of alteration of the deep reflexes is exaggeration. This may pass into diminution, and even apparent loss when ordinary stimulation is used. Ankle clonus, transient in nature, is occasionally found in neurasthenia.

thenia. "If it pass beyond three vibrations of small excursion we must suspect organic disease" (Allbutt).

Condition of organic systems.—(1) Disturbances of the heart and circulation are very common in neurasthenia. The heart is accelerated, and palpitation very frequent, especially on lying down. The patient complains that it "shakes the bed," or "turns over." The vaso-motor system is deranged, and patients complain of alternating sensations of heat and cold, flushing, etc. As a rule the skin of the extremities is pale and cold, due to a general increase of vaso-constriction, not to a feeble circulation, as popularly supposed.

(2) Atonic dyspepsia, leading to gastric dilatation and fermentation, is very common in neurasthenia.

We have already referred to the subjective sensation of nausea and so-called hysterical vomiting. Obvious general wasting is a well-marked phenomenon. Constipation and diarrhoea are almost equally common, the latter being the so-called "nervous diarrhoea."

(3) The amount of urine passed in twenty-four hours is increased, and is of lowered specific gravity owing to decrease in the percentage of solids. Micturition is markedly increased in frequency.

(4) Pyrexia. A rise in temperature without other signs of pyrexia is sometimes seen in acute traumatic neurasthenia. The temperature does not often rise above 101° , though cases have been reported, notably that of Teale, where it has reached 113° and even higher. The temperature curve shows a rapid rise, a brief fastigium, and a very rapid fall.

Summary of symptoms.—The complex of symptoms of traumatic neurasthenia is admirably summed up by Page in the following words: "There is mental weakness and there is physical weakness; weakness of will, of attention and power of thought; weakness, or easily induced fatigue, of the special senses which minister, both consciously and unconsciously, to the processes of the mind; feebleness of voluntary muscles and general lack of muscular tone; and feebleness of the involuntary, as shown by the character of the circulation, both central and peripheral, by want of tone in the bladder wall, and by feeble peristalsis in the intestines; depression of the secretory apparatus, indicated by sweating and other vaso-motor disturbances; impaired digestion and nutrition, and the loss of sexual vigour—each and all bear witness to the nervous exhaustion and depression, to the

wide-spread weakness, which results from the nervous shock, and is expressed in the convenient word 'neurasthenia'."

Pathology.—Of the morbid anatomy of neurasthenia we know nothing.

Prognosis.—This depends upon (1) the previous occurrence of serious illness—more especially zymotic diseases; (2) the presence of a neurotic family history; (3) the severity and duration of the symptoms; (4) the age of the patient. While each case must be judged upon its merits, on the whole the prognosis may be said to be favourable, though there is a marked tendency to relapse on any impairment of the general health or strain upon the nervous system due to overwork, shock, sexual excesses, etc., and the tendency to relapse increases with each attack. Again, the prognosis depends upon the ability of the patient to give himself fully up to treatment, which is often prolonged and expensive. The most troublesome cases are those in which sensory disturbances are strongly marked.

Treatment.—In acute cases the patient should be kept absolutely in bed, perfect quiet enjoined, and all means taken to counteract any hyperæsthesia of special senses that may be present. Careful diet, a light course of massage, and warm douches should be prescribed. The length of treatment will depend upon the severity of the case.

In the chronic cases the essentials are to restore the bodily nutrition and to keep it restored. For this, two forms of treatment are available: (1) by drugs; (2) by "rest cure."

(1) This is usually a very prolonged and only partially successful method, and that too only in cases of moderate severity. Iron, arsenic, phosphoric acid and nux vomica, are the most useful drugs, but their administration must be prolonged. Bromides as sedatives or analgesics, and alcohol as a stimulant are both injurious and should be rigidly forbidden.

(2) The "rest cure" or Weir-Mitchell method of treatment is really the only means by which recovery can be expected in at all severe cases, and is the only treatment that gives satisfaction in the end both to patient and medical attendant. The three absolutely essential factors are isolation, massage, and full feeding. These must go hand in hand if any good results are to be obtained.

The isolation must be complete and absolute for the first month at least of treatment.

The massage should be both general and special, and be given over a period of not less than six weeks to two months. The special massage should be directed to the chiefly affected parts.

The feeding must be carefully arranged on a special scale to suit each particular case. It should be preceded by two or three days of restricted milk diet. The food should be easily assimilable, and given in small quantities at frequent intervals both day and night.

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A CLINICAL LECTURE

ON

SOME ACUTE PARALYTIC AFFECTIONS OF THE STOMACH AND INTESTINES.

By H. CAMPBELL THOMSON, M.D., F.R.C.P.,

Assistant Physician to the Middlesex Hospital;
Physician to the Hospital for Epilepsy and
Paralysis, Maida Vale.

GENTLEMEN,—Recent investigations concerning the functions of the digestive system have served, more than ever, to impress upon us how intimately these functions are dependent upon the activity of the central nervous system. The striking experimental researches of Pawlow have shown that the very secretion of the gastric juice itself is mainly connected with the desire for food, and that a healthy appetite is the surest precursor of a good digestion. In such circumstances it is hardly a matter for surprise that the nervous mechanism presiding over the muscular movement and glandular secretion of the alimentary canal sometimes breaks down, and gives rise to paralytic symptoms somewhat analogous to those with which we are familiar in other parts of the body. Moreover, in the case of the alimentary canal, there appears to be an intimate relationship between loss of muscular power and excessive secretion; for, as will be seen later on, loss of muscular power of the stomach and intestine is frequently accompanied by the secretion of large quantities of fluid. Paralytic affections of the stomach and intestines are of great importance in medicine and surgery. In the former their onset may turn the balance against a patient who is suffering from some acute or chronic disease, and in the latter their occurrence may cause death after operations which have not necessarily had any connection whatever with the abdomen.

Of forty-four fatal cases of acute dilatation of the stomach, which I have collected in my book on

the subject,* no less than twelve were associated with surgical operations, and of these twelve, only four were associated with abdominal section.

Acute dilatation of the stomach is, in severe cases, one of the most dangerous diseases connected with the digestive system, and the appearance of the stomach in such a case is well seen in the accompanying figure. The symptoms are usually sudden in onset, and may either occur in a person who appears to be in his usual health, or they may complicate some existing medical or sur-

on palpation a sense of fluctuation and a succussion splash may often be obtained, both of which are valuable aids to diagnosis when they are present. As you may imagine, peristalsis is not likely to be seen, because the main defect consists in loss of power, and I have only been able to find one case recorded in which it was observed.

Having arrived at the conclusion that you are dealing with a case of acute dilatation of the stomach, it is necessary, both for the sake of making a prognosis and carrying out treatment, to endea-



FIG. 1.—Post-mortem appearance of a case of acute dilatation of the stomach which occurred as a complication of pneumonia.

gical complaint. In a typical case some discomfort and a sense of fullness in the abdomen are rapidly followed by the vomiting of huge quantities of greenish- or brownish-coloured fluid, which is often literally poured out of the mouth. At the same time the pulse-rate rises rapidly and the temperature falls, the urine becomes scanty or entirely suppressed, and the patient becomes progressively weaker, and may die in a very few hours.

Physical examination shows distension of the abdomen, chiefly in its left and lower regions, and

* 'Acute Dilatation of the Stomach.' Baillière, Tindall, and Cox.

vour to ascertain with what organic disease, if any, the dilatation is associated. This may be obvious in many instances, but in others it will be very obscure, and among the latter class may be instanced cases where the dilatation exists with, and in fact depends upon, a general peritonitis, especially when there has been no reason to suspect any cause for the latter. In such a case the symptoms of the paralytic distension of the stomach and intestines, which are one of the consequences of inflammation of the peritoneum, may sometimes be so severe as to cause the peritonitis to be overlooked, and so perhaps a more hopeful prognosis

may be given than would otherwise be the case, or some form of surgical treatment may be omitted which might possibly have proved beneficial to the peritonitis if it had been undertaken in time.

I have recorded a case* of this kind, which followed childbirth and which well illustrates an occurrence of the difficulty in making a complete diagnosis of all the factors present.

It is convenient to describe acute dilatation of the stomach separately from the corresponding paralytic condition of the intestine, but as a matter of fact the two frequently exist together, although naturally in any given case the symptoms of the one are liable to predominate over those of the other. It

on the duodenum under certain conditions in which the mesentery is dragged downwards—as, for instance, by the prolapse of intestines into the pelvis; but there are many objections to this being a likely thing to happen during life. Moreover, if the constriction by a band of this kind is to be severe enough to cause such pronounced symptoms as those which accompany acute dilatation of the stomach, surely it also would be complete enough to cause the other usual symptoms of acute intestinal obstruction, especially the absolute constipation; but this is by no means always the case, for diarrhoea is sometimes a prominent feature of the illness. In a case recorded by Dr. C. R. Box and



FIG. 2.—Acute dilatation of the stomach and upper eight feet of intestine.

is this frequent co-existence of dilatation of various lengths of the intestine with that of the stomach which has helped to negative some of the arguments that have been brought forward in order to endeavour to show that acute dilatation of the stomach is primarily due to some obstruction. It has, for instance, been suggested that a spasm of the pylorus is the cause, but since it has been shown that the dilatation generally extends beyond the pylorus, this idea must be given up.

Another suggestion, which has received some support, is based upon the possibility of the superior mesenteric artery exercising a constricting influence

Mr. Cuthbert Wallace, where the acute dilatation occurred during the course of an attack of lobar pneumonia, there was profuse and uncontrollable diarrhoea, the bowels being opened fifteen times on the eighth day, five times on the ninth, and eleven times on the tenth day of the disease.

Then, again, complete intestinal obstruction is frequently met with, but it is rarely accompanied by symptoms of acute dilatation of the stomach. But the strongest argument of all against there being any fixed point at which obstruction takes place in these cases lies in the fact that the length of intestine which shares in the dilatation varies from a few inches to several feet, a point which is well exemplified in the accompanying figure.

* 'Lancet,' 1902, 11, p. 287.

I have discussed elsewhere the principal reasons which seem to make it probable that the dilatation is usually primarily a paralytic one, but of course once the stomach or intestines are greatly distended, some rotation or other change of position may easily take place, and so bring in the influence of obstruction as a secondary cause.

Why the nervous system sometimes gives way so suddenly and completely it is difficult to say, but two of the chief factors most often concerned in the breakdown appear to be the circulation of poisons (derived from the alimentary canal or from some acute infection, as septicæmia or pneumonia), and interference with the nervous structures of the abdomen. To these may be added any condition accompanied by severe general collapse. It must, however, be remembered that acute dilatation of the stomach may be met with in all degrees of severity. As so often happens in the recognition of diseases, as well as in other things, it is the extremes that first arrest attention, but once they are successfully established it is generally possible to trace many different stages between the slightest and the most pronounced deviations from the normal. It is certainly so here, and many examples of acute dilatation can be observed which recover under suitable treatment and which never assume the alarming symptoms that are found in the more severe cases. Until, however, the nature of the bad cases was clearly recognised, the slighter ones escaped attention, but you will see that the disease is now rightly considered to be no longer rare by the fact that, in the 'Middlesex Hospital Journal' for December, 1904, Mr. Thomas Rose, the then Resident Medical Officer to the Chelsea Hospital for Women, in writing on "Some Difficulties in the After-Treatment of Cœliotomy," mentions it among the complications that he met with and which may from time to time ordinarily be expected to occur.

The intestines derive their nerves from the sympathetic system, the branches of which run in close company with the mesenteric arteries. There are two distinct plexuses in the intestinal walls, viz. the plexus of Auerbach, which controls the muscular coat, and the plexus of Meissner, which supplies the muscular fibres of the villi, the glands, and the other structures included in the mucous membrane. This double nerve supply is of great importance; for while in some cases both sets of fibres may appear to be equally affected, in others it is appa-

rently only one set that chiefly suffers, and so the results will vary in different instances, according to the proportionate paralysis of the muscular walls and the secretory glands.

In dealing with paralysis of the intestines, then, the two features which have specially to be considered are (1) loss of power of the muscular walls, and (2) the presence of gas or fluid which will, if combined with weakness of the walls, give rise to various degrees of distension.

Diminished power, or "loss of tone" of the intestine, is due to weakness or actual paralysis of the muscular wall, while the presence of fluid often appears to depend upon a paralysis of the secretory apparatus of the glands. As in the case of the stomach, paralysis of the intestine is frequently accompanied by hypersecretion of fluid, and in this way the toneless tube becomes tightly distended. A very good example of this paralytic distension can be seen after fatal cases of peritonitis, when, at the autopsy, the intestines are frequently found distended with liquid yellow faecal fluid, which, if a cut be accidentally made in the bowel, at once spurts out and has evidently been retained under considerable pressure. At any rate, as I have already mentioned, there seems to be some distinct correlation between paralysis of both the stomach and intestinal walls and the secretion of excessive quantities of fluid, and if the fluid be not secreted, gas finds its way there instead. This excess of fluid in the case of the intestine is in keeping with the experiment of Moreau, which showed that after a loop of intestine had been isolated by ligatures, and all the nerves passing to it along the mesentery cut, a paralytic secretion took place, and the bowel was found to contain a quantity of fluid which, on chemical examination, proved to be a very dilute intestinal secretion. In the case of the stomach further evidence of this correlation between dilatation and secretion can be obtained by the observation of cases of chronic dilatation, whether due to pyloric obstruction or not, for it is a fact that when the stomach is washed out, far more fluid is often obtained than has ever been taken into it by the mouth. Osler and Macrae proved this conclusively in one case of dilatation due to pyloric cancer. On two occasions the stomach was washed out and completely emptied of its contents, and for forty-eight hours after, the patient was fed by the

rectum. At the end of this time the stomach was again emptied, and on the first occasion 545 c.c. of fluid were drawn off, and on the second 500 c.c. I recently had an opportunity of frequently observing similar symptoms in a long-standing case of dilatation which finally proved to be due to a fibrous stricture of the pylorus. The thought naturally arises that possibly the secretion is the primary factor in the dilatation, and this idea was once put forward by Mr. Henry Morris to explain

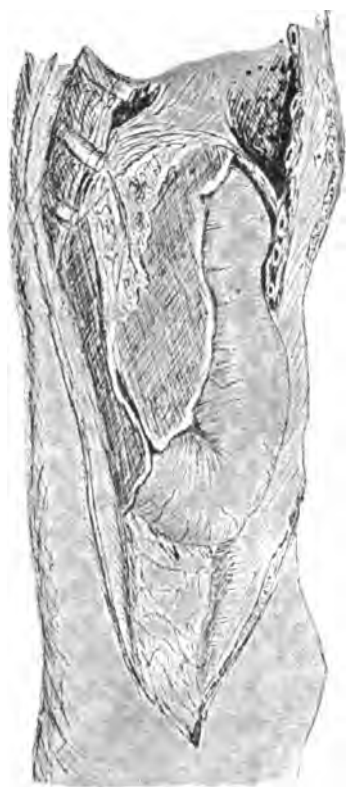


FIG. 3.—Case of commencing acute dilatation of the stomach, into which no fluid has yet been secreted.

the cause of acute dilatation of the stomach, which he, on this account, proposed to name acute gastrorrhœa, but I have shown that in many cases such fluid is absent or late in its appearance, and is not, therefore, the primary cause of the distension. A case of commencing dilatation in which no fluid had yet been secreted is shown in the accompanying figure, and in such cases the stomach is distended with gas. The exact origin of such gases is difficult to explain, and the large quantity which appears to exist is often much greater than can be accounted for by the amount swallowed or

arising from decomposition of material within the intestinal canal. It has been suggested that the mucous membrane of the alimentary canal actually secretes gases, but there does not appear to be any clear proof of this. The intestinal mucous membrane does, however, absorb gas, and it may be, as has been suggested by Sir Lauder Brunton, that some interference with the absorption of gases may be one of the causes of flatulence.

In clinical medicine, paralytic distension of the intestine is found at different times associated with various local and general affections, of which, peritonitis, typhoid fever, infantile diarrhœa, and cirrhosis of the liver may be mentioned. In surgical work it may be found after abdominal operations of all kinds and occasionally after operations upon distal parts of the body; it is also found in cases of intestinal obstruction. After abdominal operations it is no uncommon thing to find some distension of the intestines, which, although troublesome, fortunately in most cases subsides without causing any grave anxiety; but now and then it is more severe, and may even lead to a fatal termination, although there is no peritonitis present. In fatal cases of this kind the mechanical effects of distension of the abdomen become an important factor by hampering the heart and lungs, and in addition, the secreted fluid rapidly undergoes putrefactive changes, and unless it is quickly got rid of, it will be re-absorbed, and lead to still more serious consequences.

When hypersecretion is the main element, and the muscular power is retained, the liquid may be eliminated in the form of profuse and offensive motions; and so diarrhœa is the result of natural efforts of the bowel to get rid of the secreted fluid, just as the stomach endeavours to get rid of the fluid by vomiting, and it is, therefore, not wise to attempt to check either vomiting or diarrhœa in an offhand manner without first taking the natural significance of these processes into careful consideration.

With these general remarks I will now comment more particularly upon the clinical and post-mortem aspects of some different examples, and consider the best methods by which they may be treated.

First of all there are cases of intestinal obstruction from various causes, which, although operated upon, ultimately succumb. All who have had experience in making autopsies will recall cases which have

ended fatally in spite of the fact that the cause of obstruction has been successfully removed, and that no peritonitis or other apparent complication has occurred. Here, the release of the constricting band has not immediately relieved the paralysis; the bowel above the site of stricture is distended, and below it is collapsed. The distension, moreover, increases, and in spite of the fact that no food is taken by the mouth, the secretion still progresses until the paralysed gut becomes tightly inflated with decomposing fluid.

The importance of the occurrence of these phenomena is well known to surgeons, and in severe cases of obstruction the possibility of this complication is usually anticipated by establishing an opening into the bowel above the site of the constriction, and evacuating its contents. The application of this principle has been further advocated and carried out with success in the intestinal paralysis of septic peritonitis by Mr. C. B. Lockwood.* Here there are two great causes of death, viz. septic absorption from the surface of the inflamed peritoneum, and also from the interior of the paralysed intestine, and it occurred to Mr. Lockwood that while the first might be counteracted by freely washing out the peritoneal cavity, the second might also be obviated by taking measures to provide an exit for the contents of the paralysed bowel, which is distended with gas and fluid.

Paralysis of the intestine may also be found after the peritoneum has been interfered with in abdominal operations, and here it is apparently reflex in origin, arising from local irritation of the nerves.

These cases are important on account of the fact that the condition itself may endanger life, and also because the symptoms are sometimes difficult to distinguish from those of peritonitis, a difficulty which is not surprising since paralysis of the intestine is also one of the main symptoms of peritonitis. The behaviour of the intestines after abdominal operations has been described by Mr. John D. Malcolm in a paper entitled "The Condition and Management of the Intestines after Abdominal Section considered in the Light of Physiological Facts."†

* "The Surgical Treatment of Diffuse Septic Peritonitis in Successful Cases," *Med.-Chir. Trans.*, vol. lxxviii.

† *ibid.*, vol. lxxi, 1888.

In this paper Mr. Malcolm shows that theoretically some paresis of the gut results from every abdominal section, and he also discusses the frequency with which gas is generated under these conditions.

The knowledge of the possibility of paralytic distension setting in apart from obstruction or peritonitis will in certain cases enable the operator to foresee this unfortunate possibility and to prevent it by making an aperture in the intestine at the time of the operation, and so providing an exit for the escape of gas which the paralysed gut might otherwise be unable to get rid of. Such a case has been recorded by Mr. Bland-Sutton,* in which the cæcum was treated in this way with an excellent result. In this instance there was acute distension of the cæcum which Mr. Bland-Sutton compares in his account to the cases of acute dilatation of the stomach which I have described. After puncturing the cæcum with a needle Mr. Bland-Sutton made a small opening in the collapsed cæcum and secured it to the lower angle of the abdominal incision, for he "felt that then if the cæcum were left in its collapsed and paralysed condition it might again slowly distend with gas if no channel were available for its rapid escape." Convalescence was in every way satisfactory, and no faecal matter escaped through the temporary sinus.

Occasionally, after abdominal operations, a severe diarrhoea occurs, with copious fluid excretions which are altogether in excess of the amount of fluid taken into the stomach for the first few days after the operation has been performed.

Here the paralytic secretion is the predominant factor, and the muscular coats of the intestine fortunately retain their vigour and expel their liquid contents at frequent intervals, a far more satisfactory proceeding than allowing them to accumulate and to be absorbed.

Paralysis of the intestine may sometimes be local, i.e. a certain stretch of bowel may be distended, while that above it shows no sign of distension. In one of the cases of acute dilatation of the stomach recorded by Fagge, to whom we are indebted for the first description of this disease, there was also distension of a part only of the large intestine, the intervening small intestine being apparently normal.

* *CLINICAL JOURNAL*, October 22nd, 1902.

Turning now to cases which more usually come under the care of the physician, we find examples of intestinal paralysis in various degrees and forms. For instance, we see paresis of the walls and distension by gas very frequently in typhoid fever, a condition which, when severe, adds very greatly to the gravity of the case.

As an example of excessive secretion, the summer diarrhoea of infants may be mentioned. Here there is an acute specific affection characterised by excessive intestinal secretion, so that liquid is constantly being passed far in excess of anything that is swallowed, for indeed in many cases nearly everything is vomited as soon as it is taken, and there is scarcely anything retained during the height of the disease.

Paralytic distension of intestines, like that of the stomach, may also occur during the course of other acute general illnesses, as pneumonia. The bad symptoms in these intestinal cases depend chiefly upon the retention of intestinal contents and the loss of excessive quantities of fluid. If the muscular coats are paralysed, the intestinal contents (which in many cases are greatly increased by a co-existing paralytic secretion), become stagnant and decomposed, and so the patient rapidly becomes poisoned. On the other hand, if the excessive secretion is the predominant factor, and the bowel is strong enough to get rid of it, many of the symptoms are due to the quantities of fluid that are lost, but here again the contents rapidly decompose, and unless got rid of very quickly, symptoms due to their reabsorption will be superadded. Then there are the mechanical effects of great distension on the thoracic organs to be remembered. As you have already seen, it is an established fact that many cases of acute dilatation of the stomach and intestines occur in circumstances which are in no wise connected with any operation on, or other local affection of, the abdomen, and such cases cannot be explained on the assumption that they are due to a simple reflex disturbance which might reasonably be supposed to take place through some local injury of the peritoneum. Here the nervous failure seems to involve higher centres, as well as lower, which are both apparently affected by some poison or shock. It thus becomes a point of interest to inquire into the nervous connections of the intestines and stomach and to see how this failure might be brought about. The principal nerve supply of the stomach is through the vagus,

which also exercises an influence over a varying and uncertain length of the intestines, while the main supply of the latter is derived from the sympathetic system as recognised in the plexuses of Auerbach and Meissner, to which allusion has already been made.

The functions of the stomach and intestines are so commonly looked upon as being of a purely automatic nature, that it is apt to be forgotten that influences from the brain may often be a disturbing factor. There can be little doubt but that the functions of the stomach and intestines are represented in the cerebral cortex, and a considerable amount of interesting work, which I cannot now allude to in detail, has been done in connection with the former. At present a few words about the nervous relations of the intestines will serve to illustrate the point.

In ordinary health there are no conscious sensations of the intestines; but an attack of colic soon makes it clear that the paths necessary for conveying impulses to the cerebral cortex exist, although the ordinary impulses are too feeble to make any impression upon consciousness. Likewise clinical experience of the effects of hysteria and emotional disturbances of the cerebral cortex upon the functions of the stomach and intestines shows that impulses arising in the cerebral cortex may also reach the alimentary canal. Impulses arising from the intestine can reach the cerebral cortex by at least two paths. Travelling along the sympathetic nerves to the solar plexus, they may from there pass upwards by way of the right vagus through its communications with the plexus, or they may reach the spinal cord through the splanchnic nerves, and then pass up one of the sensory paths until they finally reach the cerebral cortex. From the cortex impulses will probably pass down by the spinal cord, which they will leave opposite the 5th, 6th, 7th, 8th, and 9th segments, and finish their journey to the intestinal walls by way of the sympathetic fibres. Although no part of the intestine is directly under the control of the will, I think myself that it is very probable that the cerebral cortex exercises some continuous influence over it, analogous in a way to the constant control exerted over the voluntary muscles, the results of the loss of which are so clearly seen in hemiplegia, when the rigidity supposed to be due to unantagonised cerebellar influence sets in.

Without going into further particulars of such an intricate subject, enough has been said to show how the stomach and intestine depend for their healthy performance upon an intact nervous system, higher as well as lower, and this is further borne out by their modification in many cases of transverse lesions of the spinal cord which are often accompanied by obstinate constipation.

Lastly, the important subject of treatment has to be considered, and while individual cases must be considered on their own merits, there are, nevertheless, certain general indications which may be pointed out.

The broad lines of treatment consist in tending to counteract the chief effects which we have already seen are principally due to (1) absorption of intestinal contents, (2) excessive loss of fluid, and (3) mechanical interference with the heart and lungs.

The first group may be relieved in various ways, according to the severity of the case. In the less severe the passage of a tube into the stomach or rectum as required, together with carminatives and suitable enemata, will often relieve all the distress. If, however, these more simple procedures fail, it may be necessary to relieve the distension by performance of a laparotomy, and an incision or a puncture into the paralysed bowel. This principle, which has become so well recognised in dealing with cases of mechanical intestinal obstruction, and which we have seen has also been applied to the paralysis accompanying septic peritonitis, has hardly, I think, received due recognition in the forms of paralysis and consequent obstruction which we are now dealing with, although the end is the same in all if they are left alone.

But while there may not be much hesitation in puncturing the intestines in cases which require it when the abdomen has already been opened in order to remove some cause of obstruction or to deal with a septic peritonitis, it is quite another matter when the paralytic symptoms complicate a case of general illness other than that which can be primarily treated by surgical means. Take, for example, a case of typhoid fever, in which, late in the course of the disease, increasing paralytic distension of the intestine has become a prominent feature, and is contributing to retention and absorption of septic matter. The patient may be in a grave condition, and supposing that no relief can be obtained by enemata and the other means ordinarily at our disposal, one's thoughts might

turn to the possibility and desirability of employing surgical methods. This possibility was brought forward by Dr. T. J. Maclagan,* who suggested that, where occasion demanded, an opening into the cæcum would, if followed by an evacuation of gases and fluid, check the absorption of poisons, and at the same time relieve the mechanical pressure on the diaphragm caused by the distended bowel. Dr. Maclagan suggested that the opening could be made with the aid of a local anæsthetic only, and so the operation would not assume very formidable proportions.

I am not aware that any cases have actually been operated upon in these circumstances, and one naturally hesitates to recommend any severe measures where the patient is already so ill; but this natural reluctance should not be allowed too much weight, for when it is remembered how much surgery has done in typhoid fever to avert the fatal termination of perforation, it is not unreasonable to expect and hope that it might sometimes be of some avail in cases which, although falling short of perforation, are almost equally sure to succumb if left alone.

In paralytic cases where diarrhoea is the prominent factor, the main point is to keep up the strength of the patient and especially to supply the tissues with plenty of water which, if necessary, must be given by transfusion. The diarrhoea should not be checked in too routine a manner, for the offensive material is much better excreted than retained in the intestine, as it is apt to be if peristalsis is checked too freely. Acute dilatation of the stomach can best be dealt with by the passage of a soft tube, for the stomach is often too weak to accomplish its task of getting rid of the fluid without aid. Relief is also often further obtained by placing the patient in the prone position or even the knee-elbow position if he is not too ill.

All nutrition should, as far as possible, be given by the rectum. Where food is given by the mouth, Dr. A. E. Sears has found pulped meat, *i.e.* meat thoroughly minced and passed through a wire sieve, most useful, and he also found that the thirst which is sometimes so distressing was best relieved by warm saline rectal injections, and small drinks of very hot water. Strychnine should be given hypodermically. It is generally useless to give drugs by the mouth, as there can seldom be any reasonable prospect of their being absorbed.

The question of surgical treatment has also to be considered, but so far it has not met with much success. Cases in which the stomach has been opened and drained have not done well, and probably the performance of gastro-enterostomy as suggested by Mr. Mayo Robson and Mr. Moynihan might give a better result, but here, again, much would depend upon the length of intestine which shared in the paralysis.

* *Brit. Med. Journ.*, June 15th, 1901, p. 1466.

A CLINICAL LECTURE ON GLIOMA OF THE RETINA.

Delivered at the Hospital for Sick Children, Great Ormond Street, on February 2nd, 1905.

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GENTLEMEN,—Glioma of the retina is a malignant growth occurring only in early childhood. It forms about 0·04 per cent. of all diseases of the eye (Wintersteiner). In two thirds of the cases (314 out of 467, Wintersteiner) it is noticed before the end of the third year; many cases—probably all—are congenital. Males are affected in about the same proportion as females (221 to 208, Wintersteiner; 95 to 98, Lawford and Treacher Collins; 15 to 17, Marshall). It is found that in about one fourth of the cases the disease is bilateral (97 to 308, Wintersteiner; 12 to 43, Lawford and Collins; 12 to 32, Marshall). Both eyes may be seen to be affected at birth (Helfreich, Snell); more frequently disease in the second eye is noticed only months or even years after the first (3 years, Treacher Collins; 2½ years, Lawford). In every case, however, the growth in the second eye is an independent focus, and is not due to direct continuity by way of the chiasma. Several members of the same family may be affected (Lerche, Sichel, v. Graefe, Wilson, Newton, Calderini, Fuchs, Marshall, Snell, and others). In Wilson's cases 8 children of the same family all had glioma. In Newton's 10 out of a family of 16 had glioma retinae, 7 being bilateral; of the 10 none lived beyond the age of 3 except one, who died of recurrence at the age of 5; 5 were males, 5 females. There is no case on record of a child from whom a gliomatous eye has been removed growing up and having children with glioma. Lawford and Collins report several cases in which relations had tumours of various kinds.

The disease is unaccompanied by pain in the early stages, and the child is brought to the surgeon on account of the bright white or yellow reflex from the pupil. This condition has long been known as the amaurotic cat's eye, so called because the eye is blind, and because it shines like

a cat's eye. By focal illumination a light-coloured nodular mass, covered with fine vessels, is seen behind the lens.

Glioma retinae runs through the same stages as other intra-ocular tumours, viz. (1) intra-ocular growth; (2) secondary glaucoma; (3) extra-ocular extension; (4) metastasis. The glaucomatous stage may arise suddenly, *e.g.* after an injury or instillation of atropin (Hirschberg). It results in enlargement of the globe, followed by apparent or real exophthalmos. Stretching of the walls of the eye may manifest itself first as megalocornea (Vetsch) or keratomegaly (Parent). Later, the sclerotic stretches, usually in the intercalary zone, in other cases between the insertions of the recti and the equator, seldom at the posterior pole. In the last two groups there is proptosis, which is much increased in the third stage, if the extra-ocular extension is retro-bulbar. The third stage is usually accompanied by great diminution of pain, owing to relief of tension. There is generally a discharge of yellow material, which may be pus if severe keratitis has supervened. Perforation often occurs at the limbus, and is followed rapidly by fungating growth. The lids are seldom infiltrated, but are stretched and thinned. Metastasis first occurs in the preauricular and neighbouring glands, later in the cranial and other bones (ribs, humerus, etc.). Direct extension by continuity to the optic nerve and brain, cranial bones, etc., is commoner, and metastases in other organs (usually the liver) are relatively rare (*cf.* Sarcoma). In most cases the first stage lasts from 6 months to a year; statistics of the second stage are few and untrustworthy, and vary from a few weeks to 21 months (mean, 7 months).

There are fifteen cases on record of glioma of the retina associated with shrunken globe (Parsons). In no less than ten of the cases it is stated that the other eye was the seat of glioma, in another case this eye was blind, whilst in the remaining four the condition of the other eye is not stated, so that it may be safely concluded that it was normal. In several of the cases there is no doubt that the eye became perforated before the onset of the shrinking, usually as the result of extra-ocular extension of the growth. In the other cases it is almost impossible to decide whether perforation occurred or not; it is a difficult point to settle in a shrunken eye on pathological examination alone.

There have often been inflammatory symptoms preceding the phthisis bulbi, and it is probable that the shrinking is due to this rather than to any inherent tendency in the growth itself (Brailley), comparable with atrophic scirrhous: such an occurrence must be so rare as almost to negative the hypothesis. I am still of the opinion that the gliomatous nature of the cells in these shrunken eyes is not placed absolutely beyond cavil. It is, however, of the utmost importance that all similar cases should be carefully investigated and put on record.

There is a cognate question which is of considerable interest, viz. temporary retrogression in glioma retinae. Such cases appear most frequently in the earliest reports, probably owing to the fact that the need for immediate operation was not recognised (Wintersteiner). Almost invariably the tumour commenced to grow again rapidly at a later date, and the few cases in which this did not occur may be reasonably considered to have been errors in diagnosis. The difficulties in the differential diagnosis of glioma from pseudogliomata of various kinds are often so great as to be insuperable. Many of these cases show temporary diminution of intra-ocular tension and distinct tendency to shrink, without, however, going on to complete atrophy of the globe. They therefore represent a group very nearly allied to the cases under discussion, and are of great importance in demonstrating that quite undoubted gliomata may show signs of shrinking at some stage of their history.

Including the cases of complete phthisis bulbi, Lagrange has collected twenty-one cases which showed temporary retrogression. The cases reported by Tyrrell, Rolland, Knapp, and Grolmann are particularly interesting in that they showed alternate tendencies to shrink and to grow. The most striking is Grolmann's case. Here a child of six had had the right eye removed for glioma four years previously. The left then showed a grey reflex; no vessels could be seen. After two days' treatment with inunctions the mass diminished in size, and in seventeen days it could only be seen with the pupil dilated. Five weeks later numerous yellow nodules were seen floating in the vitreous, and two months afterwards the tumour commenced to grow, accompanied by inflammatory symptoms. Hypopyon appeared, which was repeatedly evacuated, but recurred. The growth increased until it

reached the lens, glaucoma setting in; then the cornea became ectatic. Finally the tumour filled the anterior chamber, perforated the cornea, and grew rapidly outside the globe. In about a month the child died, the disease having lasted in this eye for eleven months. It will be noticed that this eye never shrank.

Diagnosis.—There are several other conditions which give rise to the same clinical appearances as glioma of the retina. The chief of these are (1) congenital defects, due to persistence of the fibro-vascular sheath at the back of the lens; (2) tubercle of the choroid, especially the confluent type; (3) inflammatory deposits in the vitreous, with or without detachment of the retina. These conditions are usually grouped together as *pseudoglioma*.

The most important points in the differential diagnosis are well set out by Treacher Collins.

(a) *History.*—The history of fits, unconsciousness, attacks of screaming, ear disease, one of the acute specific fevers, syphilis, etc., would be in favour of pseudoglioma of the third type. Opacity noticed soon after birth points to glioma or pseudoglioma of the first type. Tubercle may be associated with similar lesions in other parts of the body.

(b) *Appearance of the opacity.*—Glioma exophytum resembles a simple detached retina, showing a smooth surface with the retinal vessels upon it. Glioma endophytum, which is rarer, shows a ragged surface, often with hæmorrhages, and having poly-poid or free nodules floating in the vitreous. Congenital deposits are usually greyer, and a clear peripheral reflex can often be seen with the dilated pupil. In inflammatory membranes behind the lens the vessels are generally smaller than in glioma.

(c) *Anterior chamber.*—In glioma the anterior chamber is usually shallow. Deepening of the periphery from retraction of the iris is almost pathognomonic of inflammatory pseudoglioma, but the chamber may be shallow in these cases also, and is generally so in cases of the first type.

(d) *Iris.*—Posterior synechiæ are presumptive evidence of inflammatory pseudoglioma, but occur rarely in true glioma. Hyphæma is of little diagnostic significance. Persistent pupillary membrane is suggestive of the presence of other congenital abnormalities—i.e. of pseudoglioma of the first type.

(e) *Tension.*—Intra-ocular tension is extremely

difficult to determine in infants' eyes. If the tension is raised, the evidence is in favour of glioma, if lowered, of pseudoglioma; but it must be remembered that lowering may occur in glioma (*vide supra*), and that increase of tension may be present in the early stages of inflammatory pseudoglioma.

Even when every precaution is taken there is a well-defined group of cases in which I believe it is absolutely impossible to be certain of the diagnosis. I have seen such cases wrongly diagnosed by the best observers. Considering that the life of the patient is at stake and that the eye is in any case useless as an organ of sight, there can be no doubt that these cases should be treated as glioma.

Macroscopic appearances and general structure.—Glioma, before hardening, is a soft, almost fluid tumour, of milky whiteness, showing on section red spots and lines where the blood-vessels are cut across, and sometimes hæmorrhages. In other cases the growth is grey or yellow, with chalky white spots, or occasionally gelatinous and semi-transparent. It resembles nearly brain tissue, hence the name "medullary cancer" (*Markschwamm*, Hirschberg). The white spots are gritty, and are due to calcareous degeneration (Robin). Old hæmorrhages may be represented by pigmentation.

In the early stages there are usually several nodules (rarely only one), the larger ones being surrounded by smaller satellites. The main mass of the growth is usually in the subretinal space, on the outer side of the retina, which is detached (*Glioma exophytum*, Hirschberg). Much less frequently the retina is *in situ*, or only slightly raised from the choroid, the growth is not flat on the inner surface, as in the usual type, but irregular, with polypoid outgrowths (*Glioma endophytum*, Iwanoff, Hirschberg); in this case the retina is more generally affected and uniformly thickened. The distinction is of some clinical, but little pathological importance.

Glioma in stained sections shows a quite characteristic structure even with very low magnification. The stain is strongly taken up in convoluted lines and dots, separated by masses which only take on the protoplasmic stains. With a higher power the deeply stained parts are seen to consist of circles and cylinders of thickly grouped cells, arranged in 10-20 layers around and along axial blood-vessels.

Between these peri-vascular sheaths are necrotic or fattily degenerated cells, which only stain diffusely or not at all with nuclear stains. The arrangement is particularly well seen in sections stained with hæmatoxylin and eosin: here the blood-corpuscles which are usually packed in the vessels stain deeply with eosin and form a centre surrounded by a ring of deep blue nuclei, outside which are irregular necrotic areas which stain red, with or without a transition zone of purple.

This peculiar structure was made out first by Iwanoff, and led da Gama Pinto to describe the tumour as *glio-angio-sarcoma* or *tubular glio-sarcoma*. It is invariably present in the early stages (Flexner, Jung, Wintersteiner), in spite of which it has often been redescribed as a rare occurrence (Eisenlohr, van Duyse, etc). The intermediate zone, when present, is a fourth to a third as thick as the nuclear ring. The cause of the structure is the progress of the growth in the immediate vicinity of the newly forming blood-vessels, as is shown by the rich supply of mitoses here (Mazza), and by dahlia-fuchsin staining, whereby the younger cells are stained red and the older blue (Eisenlohr). The necrotic areas are due to insufficient nourishment of the rapidly growing cells at a short distance from the vessels, and this explains the transition zone. This is often absent, however, the line of demarcation being so sharp that one suspects the presence of a membrane: there is never one, but often a cleft in hardened sections. Wintersteiner explains this condition as follows:—The tumour cells are dependent upon the vessels for nourishment; as the latter grow they draw their cellular mantle after them, pushing the neighbouring tissues apart, whereby it often happens that they come into immediate contact with necrotic areas which are not directly derived from them. It is also very probable that the new vessels directly invade necrotic areas. Both views account for the fact that the cellular coils are often apposed to calcareous concretions, which are common in the dead parts.

The first sign of cell-degeneration is seen in the nuclei being smaller and more deeply stained, and later the deeply staining zone is narrowed.

Origin and propagation.—The researches of v. Graefe, Hirschberg, and Knapp definitely proved the retinal origin of glioma. It arises about four times as frequently in the posterior part (51:12

Wintersteiner), and generally below (medial 16, lateral 18, below 21, above 4).

The resemblance of the cells to the nuclear layers early pointed to these as the starting-point (Robin, Horner and Rindfleisch; the inner layer—Schweigger, Hirschberg; the outer—v. Recklinghausen, Virchow). Manfredi cited a case arising "from the nuclei at the base of the radial fibres, described by Kolliker." Iwanoff found another arising in the nerve-fibre layer (also Hirschberg, Brailey, Wintersteiner). Wintersteiner gives the following table of origin in the few cases in which it can be asserted with probability:

(a) From the nerve-fibre layer . . .	5
From the inner nuclear layer . . .	19
From the inner layers chiefly . . .	12
	—
	36
(b) From the outer nuclear layer . . .	9
From the outer layers chiefly . . .	3
	—
	12
(c) From the nuclear layers (either both or without further details) . . .	6

Glioma therefore arises much oftener—about three times—from the inner than from the outer layers of the retina; but it probably arises from various layers, not only in different cases, but also in one and the same case (Leber). It is important to note that the terms endo- and exo-phytic have nothing to do with the layers of the retina (Brailey, Knapp, v. Michel), but only with the direction of growth.

In all the published cases the tumours are multiple, even in the earliest stages, though one growth is larger than the others and may be called the primary growth. That some of the others are also independent nodules, and not local metastases, is probable, especially when one remembers that in a fifth to a fourth of all the cases there has been a glioma in the other eye, and in most of these it is practically certain that it was an independent growth. At the same time, different specimens vary much in appearance, from an apparently single large growth to a plentiful sprinkling of the whole retina with "miliary" growths of various sizes.

The extension of the growth in the retina itself takes place in two ways: (1) by proliferation of

the primary growth; (2) by the deposition of local metastases, which are gradually overtaken and absorbed by the primary growth. The cells proliferate by karyokinesis, and extend almost entirely along new-formed vessels by the methods already mentioned. The formation of metastatic satellites is a characteristic phenomenon which is almost, if not quite, unknown in other intra-ocular growths. Cells of the primary growth break off and float free in the vitreous or subretinal space, where they continue to grow. In this manner they are sown upon the retina around the primary growth and produce subsidiary tumours. The cells are carried to more distant spots in the eye and in the body generally, both by the lymph and by the blood.

By the lymph-vessels the cells grow along the blood-vessels, which have a perivascular lymph sheath in the retina; and in the same way perforate the sclera along the anterior and posterior ciliary vessels, penetrate the optic nerve along the central vessels and get into the choroid along the anastomoses which these make with the ciliary vessels around the nerve. By the lymph-stream they are carried to the anterior and posterior chambers, Tenon's capsule, the vaginal space, and farther afield to the glands of the parotid region, neck, and mediastinum.

The cells enter the blood-vessels, as has been proved by metastatic deposits inside the capillaries of the liver, the walls of the vessels and the liver cells being intact (Bizzozzero). The cells have been described inside the vessels of the eye and of the growth (Wintersteiner, Nattini).

The distribution of extra-ocular metastases is indicated in the following table:

Brain and membranes . . .	43 times.
Skull and bones of face . . .	40 ,
Lymphatic glands . . .	36 „
Parotid (probably lymphatic) . . .	9 „
Skeletal bones . . .	9 „
Liver . . .	7 „
Spinal cord and membranes . . .	5 „
Kidneys . . .	2 „
Ovary . . .	2 „
Lungs . . .	1 „
Spleen . . .	1 „

(Wintersteiner.)

The *choroid* is usually first affected after the retina, groups of cells being found in the meshes

of the middle and outer layers and in the supra-choroidea. In the majority of cases the choroid is first affected near the optic nerve, probably along the anastomosing vessels, as mentioned (Wintersteiner). Groups or layers of cells are often found under the retinal pigment epithelium, and lying upon Bruch's membrane. The latter is always perforated in places in late stages, and invasion of the choroid has been described by this path (Grolmann). The perforations, however, are never present in early stages, and are due to the growth of the tumour in the choroid, as in other choroidal growths. Choroidal metastases often occur without deposits on the lamina vitrea, and *vice versa*. Another method of invasion of the choroid is by new-formed vessels passing directly from the retina into the choroid near the ora serrata (Schweigger, Hirschberg, Bochert, Baumgarten, Nattini). Such vessels are never present normally (Leber).

The optic nerve is next affected—always by continuity, very rarely before the choroid (Knapp). The nerve-fibres degenerate as the result of the retinal growth, and the tumour-cells make their way through the spaces in the lamina cribrosa, and then proliferate rapidly in the looser tissue beyond. They often become spindle-shaped here. They also pass along the perivascular lymph spaces. The septa of the optic nerve are retained for some time, only disappearing gradually when the nerve becomes swollen by being replaced by growth. Occasionally the growth breaks through from the papilla into the vaginal space, and proliferates there, the nerve proper only being attacked secondarily and late; in the early stages it is then free from growth, and is thin and atrophic. When the nerve of the opposite eye is affected *via* the chiasma, the growth attacks it from the vaginal space.

The anterior chamber may be attacked by growth forwards of the choroidal tumour, by continuity through the zonule of Zinn, which is destroyed, or often by local metastasis, isolated cells or cell-groups being carried into the angle by the lymph-stream. Hypopyon may be simulated by the last method, as I have seen. The anterior chamber may also be attacked by continuity from deposits in the iris, themselves derived from the choroid *via* the ciliary body.

Hyp hæma may also occur—always in the glaucomatous stage (Hulme, Hirschberg, Bochert, Becker, etc.); I have seen it in an eye which had all the clinical features of a pseudo-glioma, but which was found to be a typical case of glioma exophytum.

Perforation of the globe takes place along the perforating vessels—anterior ciliary, vortex veins, and posterior ciliary—most commonly near the optic nerve, with diminishing frequency from behind

forwards. Isolated perforation through the sclerotic just behind the cornea has been described by Wadsworth, Vetsch, Grolmann, etc. The sclera may be directly attacked from the supra-choroidea, or the inner laminae may be burst by the raised intra-ocular tension, and then attacked. Growth is enormously rapid in the loose orbital and sub-conjunctival tissues, so that the orbit is soon filled and the tumour grows forwards between the lids.

Prognosis.—The prognosis of glioma, if untreated, is absolutely bad. The results after removal of the eye are encouraging, and are good if the disease is in an early stage, *i. e.* before glaucoma or extra-ocular extension has set in. Even after the growth has infiltrated the optic nerve and extended to the orbital tissues, exenteration of the orbit has been followed by recovery.

Wintersteiner considers that cases which remain free from recurrence for one year after excision of the eye may be regarded as cured: this gives 16·3 per cent. cures in 497 cases. I think that this view is too sanguine. If two years is taken as the minimum the percentage is 13·7. Lawford and Collins consider that three years is the minimum, and it is very rare to find recurrence after this date, though Marshall records it after five years.

An important point to be taken into consideration in determining the prognosis is the condition of the other eye. We have seen that the disease is bilateral in about one fourth of the cases, and that the affection of the other eye may escape observation for some years. It is therefore imperative that the other eye should be thoroughly overhauled with the pupil dilated, under an anæsthetic if necessary, and that this should be repeated at frequent intervals for several years after the excision of the first eye. *In the absence of disease of the second eye the patient may be regarded as out of danger if there is no recurrence within three years.* There are several cases (*e. g.* Treacher Collins's) on record of cure after removal of both eyes for glioma.

Treatment.—The treatment of glioma of the retina is excision of the eye at the earliest possible moment. The optic nerve should be cut long, and *the cut end invariably submitted to microscopical examination.* Only by this means can the complete eradication of the disease be placed beyond dispute. If there is any doubt as to extension of the disease to the conjunctiva or orbital tissues, exenteration of the orbit is imperative.

In cases where the diagnosis is doubtful—by no means a small group—the eye should be removed, for in the case of inflammatory pseudo-glioma the eye is destined to shrink and become unsightly. *In no case should both eyes be removed at the same operation.* The eye removed must be examined before excision of the other, since the removal of two pseudo-glaucomatous eyes has been known to have occurred.

THE TREATMENT OF HÆMOPTYSIS.

By FRANCIS HARE, M.D.,

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It may be laid down as beyond question that the ordinary form of hæmoptysis depends upon a solution of continuity of the pulmonary vascular wall, and upon an intra-vascular blood-pressure at the bleeding point which exceeds the extra-vascular pressure of the tissues. We cannot restore the continuity of the pulmonary vascular wall. We might, however, reduce the disproportion between the intra-vascular and extra-vascular pressures, and this either by increasing the latter or diminishing the former.

In order to increase the extra-vascular pressure of the tissues, we might proceed in two ways: (1) We might induce pneumothorax artificially. This has been proposed; I do not know whether it has been carried out. It is, at any rate, an unduly serious procedure, and would probably often fail through the existence of extensive pleural adhesions. (2) We might, through rest and opiates which suppress cough, favour the accumulation of blood in the lung, and thereby obtain an increase in the extra-vascular pressure. Morphia, hypodermically, has been widely used, and is moderately successful in checking hæmoptysis. But in phthisis, at any rate, decomposition is prone to arise in the retained blood; and this leads not rarely to septic pneumonia with high temperature, sweating, and prolonged exhausting illness, which may end fatally. This is the history of so many cases which seemed under open-air treatment on the road to rapid recovery that I had come to regard hæmoptysis as a grave misfortune.

There remains for consideration the reduction of intra-vascular blood-pressure at the bleeding-point. This might presumably be attained in three distinct ways: (1) By inducing constriction of the pulmonary arterioles. (2) By reducing the force of the heart. (3) By promoting widespread dilation of the systemic arterioles.

Constriction of pulmonary arterioles.—For years we have sought to attain this end by astringents,

ergot, digitalis, etc., but I do not think it will be claimed that the clinical result has been satisfactory. Recently adrenalin has been used, but at least one case has occurred in which this drug prolonged and increased hæmoptysis.* This is easy to understand. On the one hand adrenalin causes widespread systemic vaso-constriction. On the other hand there is no evidence of any pulmonary vaso-constriction as a result of adrenalin. Consequently, as pointed out by Brodie and Dixon,† the drug produces pulmonary engorgement, a result which the above investigators assert also follows ergot and digitalis.

Reduction of the force of the heart.—Aconite has been used for this purpose, I believe with success, but I have no personal knowledge of its action.

Widespread dilation of the systemic arterioles.—Manifestly, this may be attained most rapidly and effectually by inhalation of amyl nitrite. Amyl nitrite has often been proposed for use in hæmoptysis, but I cannot find that it has been tried. The acceleration of the heart's action which follows its administration has been raised as an objection. Now, the acceleration of the heart depends upon the reduction of peripheral resistance, and is evidently a conservative device adapted to prevent a serious fall of blood-pressure. And the above objection could only be maintained were it true that the conservative acceleration is fully adequate to prevent a fall of blood-pressure. In point of fact, the acceleration is never fully adequate, since a fall of blood-pressure, usually considerable, always does succeed inhalation (Lauder Brunton). This fall of blood-pressure is transmitted backwards in the course of the circulation; it occurs consecutively in the aorta, left ventricle, left auricle and pulmonary arterioles.

These physiological considerations led to a trial of the drug in hæmoptysis. It was anticipated that inhalation would be followed by an immediate retardation, if not a cessation, of the bleeding. But since the physiological action of the drug is fleeting (probably enduring but a very few minutes), it was not anticipated that the therapeutic influence would be of great practical utility. The results of clinical experiment, however, largely exceed expectation.

* Dr. J. Gray Duncasson in 'Brit. Med. Journ.,' March 12th, 1904.

† 'Lancet,' December 4th, 1904, p. 1784.

CASE 1.—A man, æt. 36 years, with mitral regurgitation. Hæmoptysis had often followed chilling of the surface. Usually bleeding had persisted for from two to four days: it had never ceased under two days. Hæmoptysis began at midnight associated with marked cutaneous vasoconstriction of the extremities. Amyl nitrite instantly relieved the vascular spasm of the extremities, and hæmoptysis ceased instantaneously, although tinged expectoration continued till the following day. (Communicated by Mr. C. S. Hawkes).

CASE 2.—A phthisical man, æt. 31 years, in the Diamantina Hospital, had hæmoptysis for the first time at 4.30 p.m. Amyl nitrite stopped bleeding instantaneously. At 6.50 p.m. there was a slight recurrence, at 12.40 a.m. a rather profuse recurrence, instantaneously stopped by amyl nitrite. No further recurrence. On both occasions the patient was bringing up mouthfuls of blood at intervals of about two minutes, and on both occasions the mouthful preceding inhalation was the last of the series.

CASE 3.—A man, æt. 34 years, phthisical patient in the Diamantina Hospital, had had twelve attacks of hæmoptysis in nine years. Each attack had begun insidiously, and steadily increased in severity. No attack had lasted less than ten days; most had constituted serious intercurrent illnesses, from which he did not recover for some time. On January 16th, 1904, he began to spit pure blood, and amyl nitrite was given. The hæmoptysis stopped instantaneously, though the sputa continued blood-stained for some days. There had been no recurrence four months later.

CASE 4.—Phthisical patient in Jubilee Sanatorium, Queensland. Hæmoptysis began December 6th, 1903. Over five ounces had been lost when amyl nitrite was given. The bleeding stopped instantaneously and completely. Two months later there had been no recurrence. (Communicated by Dr. Andrew Stewart.)

CASE 5.—Female phthisical patient, æt. 26 years, in Diamantina Hospital. Had had many attacks of hæmoptysis, chiefly at the onset of menstruation; some were very profuse, and most were followed by pneumonia. On February 4th, 1904 (the menstrual period being a week overdue), she had hæmoptysis at 5.25 a.m.; this ceased instantaneously under amyl nitrite. At 8 a.m. bleeding

recurred to the extent of eleven ounces; on this occasion amyl nitrite caused an immediate retardation of the bleeding, which, however, did not cease for about ten minutes. At 11 a.m. bleeding recurred to the extent of two ounces; this ceased spontaneously. On February 29th bleeding occurred to the extent of two ounces; it ceased in three minutes under amyl nitrite.

CASES 6 and 7.—Phthisical patients at Jubilee Sanatorium. One patient had two attacks of hæmoptysis separated by an interval of half an hour. Amyl nitrite stopped both instantaneously. The other had one attack, which ceased instantaneously under the same treatment.

CASE 8.—A phthisical woman, in a very advanced stage, had been bleeding for some days. Many things had been tried ineffectually. Amyl nitrite was at once effectual. Patient died later in the day from exhaustion. No recurrence. (Communicated by Dr. D. Wield, of Brisbane.)

CASE 9.—Dr. E. Leslie Pooler of South Australia writes: "I have tried the amyl nitrite treatment for pulmonary hæmorrhage with complete success. On the night of Sept. 27th, at 11.30 p.m., I was called for the first time to see Mr. A., æt. 45 years, (a tubercular case), who, I was told, had been bleeding since 10 p.m. There was about a pint of blood. Inhalation stopped the hæmorrhage almost instantaneously. On Sept. 28th, 29th, 30th, and Oct. 1st, there were further hæmorrhages, but each ceased immediately on the inhalation. There has been no further hæmorrhage since Oct. 1st."

So far as I know the above nine are the only cases in which amyl nitrite has been administered in hæmoptysis. Summing up the results, seventeen attacks of hæmoptysis occurring in nine patients were treated by amyl nitrite inhalation. In fifteen of these bleeding ceased instantaneously or practically so: in one cessation occurred in three minutes: in one there was only a retardation of the bleeding, which ceased in ten minutes. In five cases there was no further recurrence, but in one of these, a very advanced case, the patient succumbed in a few hours. In four cases there was recurrence: in one of these the interval of freedom was half an hour, in the remainder it was several or many hours.

The absence of recurrence in half the cases and the prolonged duration of the interval in the remainder constituted the chief surprise of this

clinical experiment. In most of the cases the bleeding was stopped very rapidly after it had commenced and before blood had been lost in amount sufficient to reduce blood-pressure materially. Presumably coagulation to an efficient extent occurs very quickly in many cases.

In all cases of hæmoptysis there is a highly vicious circle in operation. The irritation of effused blood causes coughing; coughing, like any other kind of sudden exertion, causes rise of blood-pressure; rise of blood-pressure is apt to cause fresh hæmorrhage. Untreated hæmoptysis probably continues until the loss of blood becomes sufficient to cause material fall of blood-pressure and consequent coagulation and hæmostasis. At one time it was customary to accelerate this natural cure by venesection, a not irrational but a somewhat expensive procedure. Amyl nitrite operates through similar means, namely, reduction of blood-pressure. But the patient is bled into his own systemic capillaries; hence the blood is saved, and the procedure may be repeated as often as may be necessary.

Whatever its action on blood-pressure, there can be no doubt that morphia diminishes the irritability of the bronchial tubes and allays cough; hence retention of blood and the not improbable development of septic pneumonia. Amyl nitrite has seemingly no direct influence in suppressing cough. What is checked by the drug is the influx of blood to the ulcerated lung tissue, not the efflux from the air-passages. Hence expectoration continues and the lung is quickly cleared. Conformably it is found that hæmoptysis checked by inhalation of amyl nitrite is not followed by any exaggeration of the daily temperature range. Omitting Case 8, which proved rapidly fatal, and Case 9, in which the history is incomplete, in none of the remaining seven was there the least additional rise of temperature subsequent to the relief of hæmorrhage. This is, in my experience, in sharp contrast with what is frequently seen when hæmoptysis is treated by morphia hypodermically.

It is known that fear or anxiety has a marked influence in raising blood-pressure. Clifford Allbutt, speaking of some manometer observations, says: "On one occasion I observed a high blood-pressure in a patient in whom a high rate was not anticipated. No fault was found in the parts or arrangements of the instrument, and a second

inflation revealed a still exorbitant though a lower rate; a third but a few minutes later registered an ordinary rate of about 120 mm. Hg., and remained steady about this figure. The previous excess I should have attributed to some experimental fallacy had not the patient, as I put the instrument aside, said to me that he had feared from it a violent electric shock, such as one which many years ago at a fair had put him in an agony which he had never forgotten. In patients who enter upon a consultation with acute anxiety of mind the pressure is at first often excessive."* Such rise of blood-pressure is doubtless vaso-motor and due in all probability to extensive cutaneous vaso-constriction.

Now, it is claimed with good reason that the inevitable anxiety attending hæmoptysis is an important factor in the continuance of the bleeding; and a part of the immediately beneficial effect of morphia has been ascribed to its narcotic influence. No doubt this is correct. But no form of narcotic is capable of restoring the patient's confidence so effectually as the knowledge that he has it within his own power to stop the bleeding immediately it recurs; and a single inhalation of amyl nitrite usually confers this knowledge even upon the least observant of patients. In both the Diamantina Hospital at Brisbane and the Jubilee Sanatorium at Derby all phthisical patients who show any tendency to hæmoptysis are provided with a capsule of the drug which they are directed to use whenever the necessity arises, even in the absence of the attendant.

The advantages of amyl nitrite inhalation for hæmoptysis seem obvious. They comprise: the possibility of instant application and frequent reapplication by the patient in the absence of all skilled assistance, rapidity of action, unexpected duration of effect, freedom from danger, convenience, restoration of the patient's confidence, absence of retention and subsequent pneumonia.

It is hardly necessary to add that the adoption of this method does not preclude many other means of proved utility, such as complete rest in the recumbent posture, abstinence from food and drink, perhaps purgation; but the application of an ice-bag to the skin of the thorax would not be a consistent, even if it could be shown to be a harmless, addition.

* 'Lancet' March 7th, 1903, p. 646.

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ON

NUTRITION AND MALNUTRITION.

By W. H. ALLCHIN, M.D., F.R.S.E.,
Fellow and Censor of the Royal College of Physicians of
London; Senior Physician to the Westminster Hospital.

NORMAL NUTRITION.

GENTLEMEN,—It will be obvious that for a satisfactory treatment of the subject upon which I propose to address you it will be desirable and even necessary that I should commence by considering what it is we understand by the term "nutrition" as a normal process, or, rather, combination of processes. And this is the more incumbent on me since a large amount of work of an experimental character has been carried out by numerous observers in various parts of the world, which has contributed to establish a certain accuracy in our conceptions on what is admittedly one of the most difficult problems for investigation, and at the same time have suggested further hypotheses that still await verification. Clearly no useful notion can be entertained of what is to be understood by "malnutrition" until some agreement is arrived at as to what is implied by the normal process, though it may well be that many of the facts observed in those experiments which disease offers may, and undoubtedly do, contribute to the elucidation of the healthy living.

Among the various data which form the basis of biology, whether the study be that of animals or plants, of health or of disease, is the recognition of the fact that the manifestations of life are found to be invariably associated with the presence of a certain peculiar material of variable and highly complex constitution denominated protoplasm, or, better, bioplasm, with the further postulate that every vital process is the outcome of the reaction between this material and its environment; every phenomenon which the living organism presents, be it chemical or physical, or of that more peculiar character which we speak of as vital, is the ex-

pression of the conversion of potential energy into kinetic energy or the reverse. Numerous and varied as these manifestations are in beings so highly organised as ourselves, they are all to be seen in their simplest form in the unicellular organisms that maintain an independent existence, and may all be regarded as the outcome of those material interchanges between the constituents of the bioplasm among themselves and with the food-stuffs which are brought into relation with it from outside, whereby the integrity of the living matter is upheld and its continued activity rendered possible. To the processes by which the bioplasm assimilates or makes use of this outside material the term "nutrition" is applied; and, underlying as it does the characteristic activities of living matter, nutrition may in its widest sense be regarded as synonymous with life itself. It is, however, in a somewhat more restricted sense that I am now employing it, viz. to designate those preparatory changes which the ingesta undergo to fit them for incorporation in the protoplasmic molecule, and their ultimate fate therein. The subject, it will be at once seen, deals with certain compositions and decompositions of matter, the formation of more and more complex compounds with their subsequent splitting up into simpler substances. As such it comes within that province of knowledge which we term "chemistry"; but, concerned as it is with that form of matter recognised as living, the problems presented are those of "bio-chemistry," a subdivision of the parent science which is daily coming to occupy a more and more definite and assured position.

Clearly, then, there are two factors to be considered at the outset—the bioplasm on the one hand, and on the other the food or nutriment; for, I leave out of account for the present those portions of the ingesta which are incapable of being made use of by the bioplasm, and which are, therefore, innutritious.

THE BIOPASM: ITS STRUCTURE AND COMPOSITION.

And first, as to the bioplasm itself. That this substance, even in the simplest form of it with which we are acquainted, exhibits some degree of structure, some difference in appearance and consistency in different parts, is now all but universally cognised; the view that it is essentially homo-

geneous in character, and that such structural features as it exhibits are the result of post-mortem changes, or are actually artefacts, is no longer tenable. Of the nature, however, of its structure no little difference of opinion prevails, but as it is in a minor degree that I am now concerned with this aspect of the question it will suffice to say that, apart from the obvious separation into cell contents and nucleus, which are to be met with in all cells, a third structural element, known as the central corpuscle or centrosome, is to be generally detected. Each of these several constituents of the cell is to be distinguished by easily recognisable differences in the arrangement and appearance of the material of which they are made up. Further, the protoplasm of which the nucleus and mass of the cell are composed exhibits a general appearance of being formed of a more or less distinct reticulum—spongioplasm—the meshes of which are occupied by a semi-fluid substance—hyaloplasm. A similar arrangement obtains in the nucleus, the fibrillar network, owing to its behaviour with certain staining reagents, being known as the chromatic substance, the clear substance or matrix being termed achromatic. Considerable variations are met with in different cells, and even in the same cell at different times, marked peculiarities in the disposition of the nuclear fibres appearing previous to division of the nucleus—mitosis. Doubts have existed as to whether both the network and the hyaloplasm of the cell are living, or whether the reticulum alone can be so described. The most recent view, however, of the structure of the protoplasm, which shows it to have a "foam-structure," depending "upon the presence within a uniform ground-mass of a large number of extremely fine vacuoles, lying almost at the limits of microscopic visibility, and so close together that their walls consist of relatively thin lamellæ,"* would seem to suggest that the entire protoplasm is to be looked upon as living matter.

For my present purpose I am more concerned with the chemical composition of the living matter, and unfortunately our knowledge of this is much less even than it is of its structural characters. I need not remind you of the fundamental difficulty that meets the investigator, viz. that the very means that are employed for pursuing the inquiry

* 'General Physiology,' by Max Verworn, translated by Dr. F. S. Lee, 1899, p. 87.

cause the death of the material and consequent elusion of the problem. This much, however, may be affirmed, that invariably there is to be obtained from the bioplasm a certain amount—perhaps as much as 60 per cent.—of those extremely complex bodies termed proteids, composed of the five elements carbon, hydrogen, oxygen, nitrogen, and sulphur, all of them of low atomic weight but combined to form molecules of great size owing to the very large number of atoms of which they consist. Associated with these nitrogenous constituents of the protoplasm there are to be found with varying frequency particles of carbohydrates, of fats, together with inorganic salts and water, as well as such substances as urea and purin bodies (xanthin, hypoxanthin, guanin, etc.). Whilst without doubt the proteid constituents are the most important as they are the most abundant, forming in muscle about 20 per cent. to 25 per cent. solid matter of that tissue, it is by no means probable that it is as proteids as we know them that they exist in the bioplasm, and it may be taken as certain that no one form of matter is solely capable of manifesting life; rather is it the outcome of interactions among many diverse bodies. This renders it most likely that the other substances mentioned, viz., fats, carbohydrates, and salts, are in varying degree essential components of the living matter, whether they are about to be used by the nitrogenous constituents, or are the products of decomposition of those nitrogenous constituents such as urea and the purin bodies undoubtedly are.

Moreover, it must be remembered that protoplasm is far from being of a uniform composition. We are, perhaps, a little too apt in our recognition of the universality of this physical basis of life to assume that it is of constant character—if indeed its actual composition is ever considered. The difficulties surrounding the investigation of its chemical structure are such as to offer a barrier to further inquiry, and we have been so satisfied with the word “protoplasm” as all-sufficient that we go no further and fail to realise that we are really only on the threshold of the problem. But although we are profoundly ignorant of its chemical constitution, we may nevertheless affirm with certainty that protoplasm does differ in this respect, subtle as those differences may be. The protoplasm of the plant is not identical with that of the animal, nor that of the nerve-cell with that of the muscle-fibre; and it

may well be that some differences are required in the nature of the pabulum necessary for its restitution, or in any case that the intimate character of the requisite synthetic changes are of a variable range. The nutritive needs, that is to say, of all living matter are not exactly the same.

It will be desirable to consider these several varieties of substances a little more in detail, and first the *Proteids*. These bodies, which are met with in both animal and vegetable tissues, conveniently fall into two groups, which may be termed (*a*) the free proteids, and (*b*) the combined proteids. The former include the albumens and globulins, coagulated albumens, and the results of the proteolysis of these bodies, viz., albumoses and peptones. They differ, no doubt, in their actual chemical composition, but are ordinarily distinguished from each other by differences in their solubility in water or in saline solutions, in the temperature at which they coagulate, etc.

The combined proteids are compounds of the simple or free proteids with other bodies, from which they may often be separated by strong acids. The chief substances of this class are hæmoglobin, which is an albuminous compound with a complex iron-containing body; glyco-proteids, which are compounds of proteids with carbohydrates; nucleo-proteids or compounds of proteids and nucleic acid, which latter is an organic compound of phosphoric acid. It is evident that the combined proteids are more complex in their constitution than the simpler proteids; they contain more atoms, with consequent increase in size of the molecule, and some of them contain another element than the carbon, oxygen, hydrogen, nitrogen, and sulphur, of which all proteids are formed, such as iron or phosphorus. Intimately associated with all proteids are various inorganic salts which form the ash when these substances are incinerated. Though by no means to be regarded as living matter, it is likely that the combined proteids are more closely connected with the bioplasm than are the simpler bodies, and it is certain that the nucleo-proteids are specially concentrated in the nuclei of the cells, which are probably the most important portion of the living unit, whilst the bulk of the cytoplasm is made up of the simpler proteids, chiefly globulins.

Nothing definite is known concerning the actual constitution of the proteid molecule, as it may be

represented by a rational formula; even the empirical formula is for the most part very uncertain. Some attempts at synthesis have been made, but, as yet, with only partial success, and such views as provisionally obtain as to the intimate nature of the molecular constitution are derived from a consideration of the products of its decomposition. From many of the proteids, though by no means from all, by suitable treatment a carbohydrate may be split off, which, whenever its exact nature has been determined, has proved to be a compound of sugar with ammonia, leaving a moiety which contains the bulk of the nitrogen. This is the basis on which has been founded what is known as the glucoside theory of proteid constitution, which is clearly applicable to only some of the proteid bodies.

By another method of treatment, viz. by hydration, as effected by heat and mineral acids, or in a measure by the digestive ferments of the alimentary canal, the proteids are split up into amido-fatty acids such as leucine, tyrosine, etc., and basic bodies, such as lysine and arginine, from the latter of which urea can be obtained. The combinations of these amido-acids, synthesised by Emil Fischer, and named by him "polypeptids," throw more light on the constitution of the greater part of the proteid molecule than any other suggestion hitherto put forward.

Among the most constant decomposition products of proteids to be found in the tissues, and commonly referred to as nitrogenous extractives, are urea, purin, or alloxuric bodies such as xanthine, hypoxanthine, and uric acid creatine and creatinine. Others are met with in but very small quantities.

Of the living matter, at least in the highest forms of life, we have most knowledge of the composition of muscle and nerve, and it is impossible to avoid, in reference to this subject, mentioning the name of the distinguished scientist, Professor Halliburton, whose work in this direction is of the highest order and forms the basis of our information.

The close similarity in behaviour of the juice that may be expressed from fresh muscle—muscle plasma—to that exhibited by blood plasma is generally recognised. In both cases under favourable circumstances coagulation takes place due to the formation of myosin and fibrin respectively,

the precursors of these substances in the two plasmas being known as myosinogen and fibrinogen. The cause of the coagulation is assumed in each case to be a ferment. Each clot as it contracts squeezes out a fluid from its meshes—muscle serum and blood serum. After death the muscle plasma normally clots to a greater or less extent and causes the stiffening termed "rigor mortis," and it may be further observed that the muscle in its coagulation becomes acid, from the formation of sarcolactic acid, in place of the alkaline reaction that it exhibits when alive. Cold and the addition of neutral salts in both cases delay coagulation, for the due occurrence of which in blood the presence of calcium chloride is essential, as there is some reason to believe is also the case with muscle. Further examination of the myosinogen which practically forms (with the exception of a small quantity of nucleo-proteid, probably derived from the sarcolemma and from the nuclei of plain muscle plasma in which it is most abundant) the whole of the voluntary muscle fibre, shows that in its natural state it consists of two proteid bodies which coagulate at different temperatures and are precipitated by different amounts of neutral salines: for the more abundant of the two the name "myosinogen" is retained, and the other, which is certainly a globulin "analogous to the cell globulin which is found in saline extracts of all protoplasmic structures" is termed "paramyosinogen." Although it may be convenient to speak of these two proteids separately, they are not really independent. "The unit is protoplasm, and if one of its essential constituents is destroyed protoplasm as such ceases to exist." *

The ferments of muscle are also to be included among the proteid constituents of the tissue and most probably are of the nature of nucleo-proteids. One of these is a myosin ferment by which the muscle is coagulated; another is of proteolytic character and is "probably concerned in the disappearance of rigor mortis"; a third is amylolytic and converts starch into sugar—dextrose; a fourth which is glycolytic or sugar-destroying and most likely is active in carbohydrate catabolism being made able to be so by the addition of the internal secretion of the pancreas.

The proteids of the nervous tissues form a con-

* 'Biochemistry of Nerve and Muscle,' by Prof. Halliburton, F.R.S., 1904.

siderable percentage of the solids varying, according to Prof. Halliburton from 29 in the nerves to 51 in the grey matter of the brain. The most important of these bodies is a nucleo-proteid which contains but a low proportion of phosphorus, and constitutes the greater part of the chromatin. In nerve-cells this substance is not so restricted to the nucleus as it is in the cells of other tissues; for being distributed throughout the cytoplasm also, it forms what are known as Nissl's granules. The other constituent proteids are both globulins.

It is nucleo-proteids also that are the most abundant of the organic constituents of secreting glands, a circumstance that would appear to be connected with the specific functions of these organs, namely, the formation of ferments.

The next group of proximate principles of the tissues are the *Fats*. The most abundant of these are the neutral fats, consisting of the trivalent alcohol glycerine $C_3H_5(OH)_3$ combined with fatty acids—palmitic, stearic, oleic, and others—water being lost in the combination, and thus forming what are known as compound ethers or esters. By hydrolysis the fats are split up with the addition of water into the glycerine and fatty acids. The chief glycerides are tri-palmitin, tri-stearin, and tri-olein. Their solubility in ether and insolubility in water are among their most characteristic properties.

Constantly associated with protoplasm, of which they are decomposition products, are some extremely complex bodies which are included among fats, though differing considerably in composition and properties from those just mentioned. They are certainly most abundant in the nervous tissues, and it is possible that their presence in muscle is due to the involved nervous elements; some are also to be found in the blood-corpuscles, yolk of egg, semen, bile, and milk. Probably the most important are the so-called phosphorised fats, of which lecithin is the best illustration. This substance, of which really there are several forms, contains not only phosphorus in addition to carbon, hydrogen, and oxygen, but also nitrogen. On decomposition with hydrogen it forms a fatty acid, glycerophosphoric acid, and cholin; the last named, containing all the nitrogen of the molecule, is an alkaloid allied to neurin, and, as shown by Professors Mott and Halliburton in their Croonian lectures delivered lately, is an important indication of degeneration of nervous tissues, and when produced

in an amount beyond what can be oxidised into urea is responsible for certain toxic symptoms. Other phosphoretted fats are known as kephalins and myelins. Protagon is also a similar body.

Among other products of protoplasmic decomposition is cholesterin, also found very abundantly in nervous tissue. It is a monatomic alcohol composed of carbon, hydrogen, and oxygen ($C_{27}H_{45}OH$).

Fats are most widely distributed throughout the tissues, recent methods of staining having demonstrated its existence in cells not previously known to contain it. Except in the cells of adipose tissue, it is not to be found in the nucleus, but it occurs as granules and droplets of various size in the cytoplasm, which it sometimes almost entirely replaces. Besides this fat which is visible, by methods of extraction by ether or other agents, a further amount may be obtained from the tissues which otherwise gives no indication of its existence, but which clearly has to be taken into account in considering the relationship of fat to the living matter.*

The *Carbohydrates* of the cell closely correspond to the fats, both in their distribution, not being met with in the nucleus, and in their relation to the proteid constituents, of which they may be in part decomposition products and in part material about to be dealt with by the bioplasm. Like the fats also, these substances are composed of the three elements carbon, hydrogen, and oxygen, the two latter in the proportion to form water. With one exception, the number of carbon atoms is six or some multiple of that number, and hence they are known as hexoses. They may be conveniently divided into three groups: the monosaccharids ($C_6H_{12}O_6$), represented by glucose, galactose, and mannose; the disaccharids ($C_{12}H_{22}O_{11}$), cane sugar, milk sugar, and maltose; and the polysaccharids ($C_6H_{10}O_5$)_n glycogen, starch, dextrin, and cellulose. The relationship between these groups is one of progressive condensation with the loss of a molecule of water, and conversely, of course, by hydrolysis the higher may be changed to the lower forms.

Of these various substances, glucose and glycogen are the most important—so far, at least, as the higher animal organism is concerned. For it

* By such methods Dr. Leathes has shown that the different types of muscle vary in the percentage of fat they contain, being greater in the red muscles.

is to the former that all the others that obtain entrance to the body are converted, or tend to be converted, and it is in that form that the labile carbohydrate occurs in the body, whilst it is as glycogen or animal starch that they are stored pending metabolism in the liver, the muscles, and the tissues generally.

In the muscles also there are to be found dextrine and maltose, which are intermediate bodies in the conversion of glycogen into dextrose (Halliburton). There is another body, inosite, to be found in muscle which is of the same empirical composition as glucose, but is not really a sugar, being a member of the aromatic series. Galactose can be obtained from cerebrins, which are nitrogenous constituents of nervous tissue, and to be regarded as glucosides; otherwise carbohydrates are not found as such in these tissues.

The decomposition products of carbohydrates, lactic, butyric, and carbonic acids are all met with in living substance.

Of the inorganic constituents of the living cell, water is the most abundant and most important, permitting by the fluidity it confers on the cell contents of those interchanges of matter upon which the vitality of the organism depends.

The principal salts are the chlorides of sodium, potassium, and ammonium, the carbonates of the same, as well as of magnesium and calcium, together with sulphates and phosphates. Among the less frequent elements found is iron and in very exceptional cells free mineral acids, hydrochloric and sulphuric, are met with. In muscle the potash predominates among the bases and phosphoric among the acids; and the same obtains in the nervous tissues. Sodium chloride is the most abundant salt in the blood. Some work has been done by a Committee of the British Association for the Advancement of Science (which has been appointed to investigate the micro-chemistry of the cell) on the distribution of these substances in the cell. From the experiments it would seem that potassium is not found in the nucleus and is much less abundant in the animal than in the vegetable protoplasm of unicellular organisms, the former apparently being more resistant to its entrance from the surrounding medium than is the latter; but in the intestinal and excretory epithelia of vertebrates considerable quantities of potassium salts are to be found as excretory products.

The other important elements which enter into the composition of the protoplasm are phosphorus and iron, both of which are to be found in the chromatin of the nucleus, the latter in a "masked" form and probably combined with the carbon of the nucleo-proteid. Indeed, it may be said that there is good reason to suppose a most intimate and essential association of the various salts with the proteids in the living protoplasm, an association that is broken up when this material dies.

Oxygen and carbonic acid in a free state are to be found in all living matter, the latter as a decomposition product and the former concerned, as will be seen, not only in the decomposition processes, but also as playing a very considerable part in the consequent restitution.

Such, then, is an account, most imperfect it must be admitted, of the nature and composition of bioplasm. The problem of nutrition is to explain how this composition is maintained, what preparation the ingesta as they are ordinarily presented to us undergo before they actually reach the cell, and finally the removal of those waste products which result from the interchanges in the living matter attendant on the liberation of its specific energies.

THE INGESTA.

In considering what are the essential characters of the ingesta—of the nutrient material, that is, which is needful to maintain living beings in structural integrity and functional capability, it has been usual to draw a distinction between animals and plants, and it would appear that this distinction has frequently been made too absolute. For although there can be no doubt as to the very different character of the food material required by, say, an oak tree and a man, and that both would starve were the nutriment of the one supplied to the other, yet lower down in the scale no hard and fast line can be drawn. Moreover, though the difference between the food of the higher animals and plants appears at first sight to be very considerable, the distinction affects the nature of the materials as taken from outside rather than in the form in which the actual nutriment is presented to the living matter. For the maintenance in structural integrity and functional activity of the bioplasm, be it of a plant or an animal, the food supplied to it must be of a more complex character than such as is absorbed by plants. Proteids and carbohydrates, fats, and some

salts are equally necessary to animal and to vegetable protoplasm, which correspond therefore closely in essentials. In plants there is for the most part a greater extent of preparation of the ingesta before it is finally made use of, the range of synthetic capacity of the plant is so far greater, and animals start with their food where plants left off, the ultimate form of material presented to the bioplasm being similar in both cases.

Experience has shown that the nutritive requirements of the animal organism are such that the food should contain certain proportions of different substances, which correspond to the materials of which we have seen the living matter is composed. A satisfactory diet should therefore consist of proteids, fats, carbohydrates, salts, water, and oxygen; and although the fats and carbohydrates may in great measure be made to replace each other, or even to be entirely withdrawn from the dietary, such modifications can only be tolerated for a limited period and are prejudicial sooner or later to the animal economy. Each group of food-stuffs is necessary, though perhaps in a somewhat different degree. Proteid food is, however, a prime necessity, although, as will presently appear, it may undergo considerable retrogression in chemical complexity before it is presented for assimilation by the living matter. This fact of proteid requirement implies that the animal organism is unable to synthesise from simple nitrogenous substances, such as ammonia or the nitrates obtained from outside and ingested as such, the complex proteid molecule which is the chief component of the protoplasm. Proteid food-stuffs, then, are an essential requisite, whether they be of animal or of vegetable origin. Not so with plants, however, which for the most part, and especially those which contain chlorophyll, are enabled to construct their proteid constituents from such simple nitrogenous compounds as the nitrates, particularly the ammonium salts. There are even some forms which can assimilate free nitrogen, such as certain bacteria found in the soil and even some leguminous plants which are characterised by remarkable nodules on the roots formed as the result of invasion by these soil-bacteria. In these cases the range of synthetic power is at its maximum, the organism feeding on the chemical element itself and ultimately building up the complex proteid. In contrast to these stand some saprophytic and parasitic fungi which are abso-

lutely dependent for their proteid construction upon some form of proteid, peptone or other, supplied as such, approximating in this respect to the animal requirements.

Whilst there are many animals—the carnivora—which can exist upon an almost pure proteid diet, such a plan could not satisfactorily be followed for an unlimited period in the case of man. On this diet, in order to obtain the requisite amount of carbon and hydrogen, such an enormous quantity of meat or other proteid food would have to be taken as to be almost prohibitive, owing partly to the difficulty of its digestion and partly to the ill effects such a food would entail in various directions. Hence a pure meat dietary within the limits that the individual can deal with falls short in the requirements as regards the carbon and hydrogen, which consequently are supplied by that tissue of the individual which is richest in these elements, viz. the fat; and this in great part, though not entirely, explains the action of such a regimen as a treatment for obesity. In consequence carbohydrate and fat foods, one or both, and preferably both, come to be a practical necessity. As diminishing the demand for proteid food beyond such an amount as is required to maintain nitrogenous equilibrium, they are sometimes spoken of as “proteid spacers,” the carbohydrates being of much greater value in this respect, a function that is also performed and more effectively by gelatin, since though an albuminoid body and so allied to the proteids, it cannot entirely replace them as an article of diet, being apparently unable to supply the nitrogenous requirements of the protoplasm, or in other words cannot be built up into tissue.

Now, the human organism, and with but few exceptions the animal organism generally, is unable to synthesise from simpler compounds, still less from the elements themselves, the required carbohydrates and fats which they obtain from the vegetable world. In plants these substances are abundantly formed, and indeed the larger proportion of the constructive material of these beings is of carbohydrate nature—such as sugar, starch, and cellulose. Green plants have the power of so using the energy supplied by rays of light in the presence of chlorophyll as to synthesise carbon dioxide and water into these more complex bodies; the nitrate and nitrite bacteria employ the chemical

energy derived from the oxidation of ammonia to nitrous or to nitric acid for the same purpose, and it is "possible that organisms may be discovered which are able to make use of other forms of radiant energy for the assimilation of carbon from carbon dioxide.*

This dependence of animal and plant life, indeed this in great measure mutual dependence, since the waste products of the former constitute the food of the latter, is one of the most striking of the harmonies of Nature. That master of word-painting, Ruskin, thus expressed it: "The earth in its depths must ever remain dead and cold, incapable except of slow crystalline change, but at its surface, which human beings look upon and deal with, it ministers to them through a veil of strange intermediate being, which breathes, but has no voice; moves but cannot leave its accustomed place; passes through life without consciousness, to death without bitterness; wears the beauty of youth without its passion, and declines to old age without its regret."

Although living beings are continuously liberating energy with ceaseless change in the condition of their component materials, it does not follow that the intake of pabulum is equally continuous, rather is it periodic. It follows, therefore, that animals and plants must retain a reserve of material suitable for use in tissue construction and force production, and so disposed that it may be conveniently drawn upon. In considering the food, therefore, account has to be taken not only of that which is taken into the body from time to time, but that which is already stored up in the body in reserve; and it is a question whether, in some circumstances, all the intake may not be stored up for a time before being actually presented to the living matter for disposal—passing, as it were, through a resting stage. In vegetables this reserve material forms no inconsiderable part of the entire plant. In them the opportunities for the absorption of food are likely to occur at most irregular intervals, sometimes of long duration, dependent as they are upon the amount of light, heat, and moisture. The duration and character of the seasons, the climate, and many other disturbing circumstances, apart from their inability to move from place to place in search of food, renders the necessity for a reserve proportion-

ately greater in them than in animals. In plants the reserve food consists chiefly of starch, which tends to be accumulated in special reservoirs such as the roots and tubers as well as in the stems and leaves, oils also are stored up, and proteids, in the form of what is known as aleurone, in seeds particularly those of the leguminous species. Fat in adipose tissue and elsewhere, glycogen, and the proteids of the tissues form the reserve in animals, the two first being probably those which are most properly to be regarded as reserve, since the supply of the needful amount of proteid is commonly forthcoming at sufficiently frequent intervals to meet the demand; but when there is deprivation of food, the proteid constituents of the less important organs furnish what is wanted to those structures upon which life depends, and, to that extent, may be looked upon as a potential reserve. It is worthy of note that in plants, and in a great measure also in animals, this reserve, which is prepared from the ingesta and represents what is over and above the immediate nutritive needs of the individual, is not actually in the form in which it is offered for assimilation. The starch or glycogen has to be converted into sugar before it can be utilised; it has, that is to say, to undergo a change similar to that effected by digestion in the alimentary canal of an animal. This fact has given rise to the comparison of "a plant when living on its reserve materials to an herbivorous animal, both as regards the substance of its food and its manner of making it available for nutrition" (Reynolds Green).

Of the inorganic salts sodium chloride is the only one that is purposely added to our food either in the course of its preparation or when being consumed. The other members of this group of substances, as previously enumerated, which are found in association with the protoplasmic molecule, are amply supplied in the ordinary articles of diet; the phosphorus required is derived, not from the mineral phosphates, but more probably from some organic compound of the element, and it is this circumstance that affords such justification as may be for the employment of glycerophosphates in many cases of impaired nutrition.

As bearing on the probable share taken by these substances in the body nutrition, it may be mentioned that the proportion of them in the milk

* Pfeffer, 'Physiology of Plants,' translated by Dr. Ewart, 1900, p. 292.

of various animals appears to vary directly with the rate of growth of the suckling; thus, *e.g.*, cow's milk is much richer than human in salts and the calf grows much more rapidly than the infant. Further, the food of herbivorous animals contains a much larger proportion of potash than that of the carnivora, and the need for extra quantities of chloride of sodium for the former animals is well known.

An important purpose subserved by some of these inorganic bodies is the maintenance of the alkalinity of the fluids which bathe the protoplasm, that reaction being a necessity for the exhibition of living activity.

Regarding the quantity of aliment that is necessary to maintain a state of metabolic equilibrium and a condition of general well-being, some observations of precision have lately gone a considerable way to confirm what has for long been supposed to be the case, *viz.* that much more food is ordinarily taken than is absolutely required. The method of estimating the energy-value of food by ascertaining the number of calories that a given weight of it yields on combustion has enabled us to formulate a dietary with greater approach to the needs of the organism and to economy than has hitherto been the case. In a paper read in April last year before the National Academy of Sciences at Washington, Professor Chittenden showed as the result of a careful and prolonged series of observations made at the Sheffield Scientific School of Yale on a number of the professors, of the students, and of the United States soldiers who were placed at his disposal by the Government, that the quantity of the solid ingesta required was but a third to a half of that usually taken by the average man. The amount of meat was gradually reduced, but enough bulk of food in all cases was consumed to satisfy the appetite. By a very thorough mastication and insalivation of the food—which was an important part of the experiments—it was found that this sense of satisfaction was attained with a smaller quantity than is usually taken. The general hygienic conditions of the subjects of experiment were carefully regulated, with the result that on the greatly diminished diet the individuals kept their weight and vigour and even increased their muscular power and endurance. Although, as I have said, the outcome of these experiments gave a scientific sanction to ideas that were very widely entertained, they are distinctly at

variance with the most authoritative pronouncements of those who have hitherto written on the subject. In one of the latest works on the subject of dietetics, *viz.* that by Dr. Hutchison, it is laid down that the requisite diet for a man of ordinary weight doing a moderate amount of muscular work should be of a value in potential energy of from 3000 to 3500 calories and that for such an individual "the daily consumption of proteids should never be allowed to sink below 100 grammes but should preferably be 125." This is fully twice as much as that allowed by Professor Chittenden. Whether the more thorough mastication and insalivation insisted on by the latter observer explains the adequacy of the much reduced amount of food remains to be proved, but certainly general experience so far has been against any such reduction in the intake. The time is not yet ripe to accept the dictum "that the animal functions, the tonicity of the structures and organs, in short the normal intra-systemic equilibrium, are the better maintained the more the sum of the ingested assimilable nutrients is limited to the amount absolutely necessary to keep the body in metabolic balance" (Dr. H. Stern, 'N. Y. Medical Record,' May 21st, 1904). The actual character of the food as it is presented makes a good deal of difference. If it be of a coarse nature, such as forms the bulk of that of the working population, a good deal of the energy obtained from the food is used up in the preparation of the rest of it, so that the total and the assimilable nutrients are not by any means the same. It is here, perhaps, that the advantage of thorough mastication is to be found, but at the same time the general tendency of the diet of the population is to improve in the digestible and assimilable character in which it is offered for consumption.

It will be obvious that the relative proportions in which the constructive and destructive phases of metabolism prevail, which especially governs the amount of food wanted, will in great measure be conditioned by the period of life. Until maturity is attained, *i.e.* during the period of growth, a large proportion of the intake is devoted to the building up of the tissues, and as the demand for chemical energy and for heat is then at its greatest, in order to effect the requisite syntheses, the need for fuel food is relatively at its greatest also, hence the total amount of food required per given body-weight is

far greater in the growing stage than it is later when full bulk is reached. During that time and previous to the decline of life the main purport of the ingesta is to supply the requisite energy and just enough only to maintain the mechanism. A lessened quantity is appropriate to old age when tissue construction has ceased, and a diminished energy is manifested in all directions.

THE RELATION OF THE BIOPLASM TO THE INGESTA.

Such, then, are the two material factors of the nutrition problem—the living matter of unknown and perhaps unknowable exact composition, of the chemical nature of which we have any conception from its derivatives only; and, on the other hand, its food, which corresponds in great measure to these same derived substances. It now behoves us to consider the active relation of these factors to one another, how it is that the bioplasm deals with the food and the outcome thereof. I need scarcely remark that very much of what one can say in reference to this question is quite hypothetical; but at the same time it may be observed that some ground for these hypotheses is furnished by the results of experiments, and such hypotheses best serve to explain in our present state of knowledge the problems with which we have to deal, whilst it is perfectly admitted that such concepts are subject to modification or even overthrowal, should well-ascertained facts render this necessary.

Foremost among these fundamental notions is that the living matter in mass, as also in its constituent molecules, “consists of a permanent part which is not concerned in the performance of function, and of a collateral part which is used, *i.e.* disintegrated, in every transition of the molecule from the inactive to the active state, to be immediately reconstituted when action ceases” (Prof. Sir J. Burdon Sanderson, British Association for Advancement of Science meeting, 1904). Such an assumption does not exclude the idea of the “permanent part” undergoing a certain amount of wear and tear, which necessitates its repair or renewal. And it is further very certain that the “collateral part,” the changes in which underlie the manifestations of energy which the living matter exhibits, is of a higher degree of chemical complexity than the ingesta, which are destined to replace it and maintain the supply of fresh material which has under-

gone disintegration. There is therefore a series of synthetic changes which the ingesta undergo to enable them to become integral parts of the bioplastic molecule, as there are another series of changes associated with the breaking down of the molecule. Whilst the precise condition of the living molecule is quite unknown to us, it is into the synthetic (anabolic) and analytic (catabolic) changes that gradually light is penetrating. Although we are thus in the habit of speaking of a progressively ascending series of changes which the food undergoes in its passage towards assimilation by the existing living matter, becoming as it does living, and then passing downwards through another series of changes, forming in our mind somewhat the conception of a pyramid up the slopes of which the requisite food-stuffs travel with ever-increasing complexity of composition until, when the summit is reached, the molecule topples over, as it were, from sheer instability, to pursue its descent towards those simpler atom groups which we recognise as waste products, liberating in its progress that energy which it had accumulated in the progress of its synthesis. Although, I say, we conceive of the anabolic processes as succeeded by those of catabolism, it is more than probable that they are in great part coincident and even mutually involved. It may even be the case also that the stimulus to restitution is to be found in the preceding disintegration, the former taking place at the moment that the living molecule splits up.

It has also to be remembered that for the carrying out of the synthetic changes energy is requisite—kinetic energy, that is, which becomes potential in the advancing molecule, later to be reconverted into kinetic as the molecule undergoes decomposition. It is generally believed that the requisite energy for this purpose is derived, in the higher animals at least, from the heat and chemical energy liberated in the course of catabolism; that is to say, the very constructive changes are dependent for their production upon coincident decompositions, and one cannot but marvel at the character and nature of this energy which effects both the synthetic and analytic changes if we compare them, with what is requisite to effect those same integrations and disintegrations in the comparatively few cases which we have been as yet able to imitate in our laboratories. The following illustrations will

suffice. Indol is a product of proteid decomposition which is readily formed by certain bacteria in the intestine; to produce the same result in our test-tubes it is necessary to fuse the proteids with caustic alkalis, a proceeding that would be absolutely destructive, of course, of the living tissues. By passing an alternating current through a solution of ammonium carbonate, or by the action of heat on ammonium carbamate, urea may be formed, and the same occurs on boiling proteids for some hours with hydrochloric acid. Now, these processes, which require very strong reagents and some considerable time, are rapidly and easily effected by the living cells or their products. It is the dependence of the synthetic processes upon the energy supplied by catabolism that justifies me in saying, as I did just now, that both anabolism and catabolism are, in a great degree, coincident and in a measure mutually involved. So far as we know it is by chemical energy that synthesis is effected in the animal body, just as "muscular work is accomplished by the transformation of a corresponding amount of chemical energy" (Burdon Sanderson, *loc. cit.*) But green plants have the power of effecting the required combinations by means of sunlight, and a few members of the vegetable kingdom can utilise the heat rays of the sun for the same purpose; in both these cases the presence of a pigment, chlorophyll or ether, is essential. Whether the hæmoglobin of the blood can play a similar part in animals, or whether electrical energy or any other forms of radiant energy are equally capable I do not know.

But whilst we realise that a complex series of anabolic changes intervene between the nutriment as taken into the body and its final incorporation into the protoplasmic molecule, changes which are closely related to those of a catabolic character, which result in the production of the body waste, there still remains to be explained the essential point of the whole problem which I have just spoken of as the incorporation into the molecule of the pabulum. The most plausible hypothesis that has been put forward to give an exact meaning to this process, which we denominate "assimilation," is that with which the name of Ehrlich is associated. He conceived that in the protoplasm molecule were certain atom-groups which attracted—it may be presumed chemically—corresponding atom-groups of the circulating pabulum, and that

the receptive atom-groups of the protoplasm are excited to formation as the response to the presence of the nutrient material. To another atom-group he conceives the ferment is attached, constituting, as he terms it, the "complement," by the action of which the actual assimilation is effected. An extension of this hypothesis constitutes his side-chain theory of immunity.

CHANGES IN THE INGESTA—DIGESTION.

My next step, then, is to put before you in summary—for time permits of no more than that—an account of the successive changes undergone by the ingesta, from their intake to their assimilation by the bioplasm, so far as we know or have any conception of them. Obviously the first of these are those which are comprised within the term "digestion."

It is this function which is concerned with the conversion of the ingesta into such a fluid and diffusible condition as to fit them for absorption into the blood-current, which is clearly an essential preliminary to their assimilation by the living cells. Except the inorganic food-stuffs, the other alimentary principles—proteids, carbohydrates, and fats—require more or less digestion; since, although it cannot be said that all the substances included within these groups are absolutely incapable of being absorbed—for even some native proteids may pass through the intestinal mucous membrane—for the most part the size of their molecules is so great that their diffusibility is extremely slight. It is probable, however, that the absorption of the digested food-stuffs does not depend, as will be seen, entirely on their osmotic pressure, but that the living tissue-elements which intervene between the gastro-intestinal contents and the blood or lymph-current exercise some vital share in effecting the absorption.

The digestive changes in the alimentary canal are brought about, as is well known, by the secretions of special glands that are poured out into the mouth, stomach, and intestines, the efficiency of which depends upon the presence in them of special ferments or enzymes which are the products of the metabolic activity of the gland cells. To a similar source the hydrochloric acid of the gastric juice is to be attributed, the parietal cells of the peptic glands being regarded as specially concerned in its formation from the chlorides of the

food, probably by the action thereon of the alkaline phosphates. The change the several ferments determine in the various alimentary principles is of the nature of hydrolysis, the substance acted on taking up the elements of water. For their satisfactory action certain conditions must exist, such as a temperature corresponding to that of the body (at a heat of 60° – 65° they are permanently destroyed), and a fairly constant state of acidity or alkalinity of the medium according to the special secretion; thus the pepsin and rennin formed by the central cells of the gastric glands act best in the presence of 0.2 to 0.3 per cent. of hydrochloric acid, a higher percentage than 0.4 hindering the action of the former, which is stopped altogether in an alkaline solution. On the other hand, the pancreatic enzymes, trypsin, amylase, and steapsin will only act in an alkaline medium, which is produced by the sodium carbonate of the secretion (as well as the alkaline bile), their efficacy being destroyed in the presence of an acid. The ptyalin of the saliva requires a neutral or slightly alkaline medium*, and the intestinal juice is alkaline in reaction. The bile plays a subordinate part in digestion, chiefly aiding the pancreatic juice in virtue of its alkalinity, especially supplementing the fat-splitting enzyme by facilitating the absorption of the resulting soaps, which of themselves are not very soluble, and also as a stimulus to the intestinal movements; otherwise it is chiefly of an excretory character. Most important is it that the products of digestion should be absorbed out of the way, as an accumulation of them seriously impedes, or altogether stops, the further activity of the ferments.

As showing still further the complexity of the conditions that obtain in the gastro-intestinal tract it has been found that the several digestive ferments "are to some extent protected from the destructive action of acids or alkalis and high temperature by the presence of proteids. This protection is exerted mainly by the proteid combining with the acid or alkali present, and so pre-

venting it reacting upon the ferment," but in certain cases it would seem that the protection is afforded by a combination or interaction taking place between the ferment and proteid. In such manner is the efficiency of the ferments ensured against such injurious conditions as might be supposed to be not unlikely to occur, and by the agency of the very materials upon which these bodies exert their peculiar activity (Dr. Vernon, 'Journal of Physiology,' August, 1904).

Thanks to the masterly experimental work of Professor Pawlow and his pupils, we have been led to realise the progressively interdependent character of the successive stages of the process of digestion. And though we may imitate more or less closely in our test-tubes the individual phases, and the entire exclusion from the series of a single stage—as, for instance, by the complete ablation of the stomach which has been found possible with consequent maintenance of nitrogenous equilibrium, yet the close relationship of the various stages to one another is incontestable. Thus it is shown that the special stimulus to the pancreatic secretion is the acid gastric juice; and Professor Starling, the well-known physiologist, who has especially worked at this subject, has demonstrated that as a consequence of the action of the gastric juice in the intestine on the duodenal epithelial cells, a substance called by him *secretin* is formed in them, which being absorbed into the blood is carried to the pancreas upon the cells of which it acts as a specific stimulus exciting a secretion of juice proportional to the amount of secretin present ('Journal of Physiology,' vol. xxviii, p. 325, 1902). Moreover the pancreatic fluid as poured out is inactive, and depends upon the admixture with the succus entericus for its effectiveness. And the mode of this inter-action is suggestive; the precursor of the proteolytic ferment trypsin is known as trypsinogen, but it is not until this latter is associated with a ferment of the intestinal juice named enterokinase that it becomes converted into trypsin.

There is even a more remarkable result that has been obtained by Pawlow's work, and that is the influence exerted on the secretion of the digestive fluids by different kinds of food. Briefly stated, it seems that the quantity and quality (*i.e.* the proportions of water, acid, ferment, etc.) of any juice is determined by the nature of the aliment, and in this way each different kind of food excites

* On this point consult papers by S. W. Cole ('Journal of Physiology,' vol. xxx, pp. 2–4, 1903) on "The Influence of Electrolytes on the Action of Amylolytic Ferments," wherein it is shown that the action of dialysed ptyalin on dialysed starch is increased by the addition of very small amounts of acids and of the neutral salts of strong monobasic acids.

the secretion of a fluid best fitted for its own digestion, richer or poorer in acid or ferment, and in greater or less quantity as may be required. Thus the secretion that follows on a meat diet differs in amount and composition from that excited by bread, as this again differs from what ensues on taking milk. In this way the gastric juice poured out as the result of normal appetite comes to be modified according to the food taken, and Professor Pawlow maintains that this food-induced secretion is brought about by reflex action, due to a specific stimulation of the terminals of the afferent nerves in the mucous membrane by certain qualities of the food. This subject of the adaptation of the digestive glands to the nature of the diet has been followed up by several workers; and some interesting experiments carried out by Dr. Bainbridge ('Journal of Physiology,' May, 1904) showed that lactase, which is the ferment by which milk sugar, or lactose is converted into galactose and dextrose, is normally absent from the pancreatic secretion in the adult dog, but that under the influence of a milk diet lactase is present and that this appears to be due to the action of the lactose upon the intestinal mucous membrane leading to the formation of some substance which is carried in the blood-stream to the pancreas, which is thereby stimulated to produce lactase. The general trend of these experiments, as of others, it may be observed, is towards referring these adaptive secretions to direct chemical action rather than to reflex nervous influence as contended by Pawlow.

Certainly among the many recent extensions of our physiological knowledge in various directions that connected with the digestive ferments is to be reckoned as of the greatest interest and importance, especially as helping us to understand the real nature of the changes which take place in our food on its way to the tissues. The relation of these enzymes to one another, the responses of the living cells to the varying demands made for ferments of different power, whilst but at present only very imperfectly recognised, yet sufficiently suggest great possibilities in our truer conception of the intimate nature of living processes and to exhibit still more clearly that reaction between living matter and its environment as the fundamental condition of vital activity. That capacity of the bioplasm to form an antitoxin when exposed to a toxin, and that in such case expresses a protective action, is wholly comparable to the formation by that same bioplasm of an enzyme or zymogen which shall deal with the nutrient matter submitted to it for its own advantage and maintenance. And as one injurious agent determines the formation of something which shall render it inert, so may the requisite food call forth the reagent most suitable to effect such changes in it as shall render it useful to the living molecule.

(To be continued.)

A CASE OF INJURY TO THE PANCREAS CAUSING EFFUSION INTO THE LESSER PERITONEAL SAC, WITH REMARKS ON THE NATURE OF THE INJURY AND ITS DIAGNOSIS AND TREATMENT.*

By WILLIAM SHEEN, M.S.Lond., F.R.C.S.Eng.,
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INJURIES of the pancreas are rare owing to the protected position of the organ and the depth at which it lies. They divide themselves broadly into two classes—one in which the injury is immediately fatal; the other in which the damage is less, the symptoms come on more slowly, and recovery follows after operation. In the first class the injury is only a part, often overlooked, of multiple visceral injuries—liver, spleen, kidneys, or other viscera being lacerated. In the second class the pancreas, with the peritoneum which covers and is intimately adherent to its anterior surface, is torn, and blood, serum and pancreatic secretion accumulate in the lesser peritoneal sac, the foramen of Winslow being sealed by adhesions (1). Such cases recover after incision and drainage. The cause of the injury in either class is usually either a run-over, a squeeze between buffers, a violent blow on the abdomen or a like accident. Occasionally the injury has followed a fall from a height. The pancreas is probably caught and compressed between the crushing force and the prominence of the spinal column.

The case which forms my text belongs to the second of the two classes and I proceed to relate it.

C. J—, a schoolboy æt. 15 years, was admitted to the Cardiff Infirmary under my care on October 3rd 1904, having been knocked down twenty minutes previously by a four-wheeled coal-trolley, two wheels of which passed over his abdomen from left to right. On admission the boy was somewhat collapsed, temperature 97·2° F., pulse 88; he had some pain and general tenderness in the abdomen and bruising and abrasions over the lower ribs on the left side. There was no evidence of injury to the organs in the thorax or abdomen: the urine was normal. On the following day the evening temperature was 101° F.; pulse 120. The bowels acted after an enema, the motion being

* A paper read to the Cardiff Division of the South Wales and Monmouthshire Branch of the British Medical Association, January 19th, 1905.

normal. There was no sickness. Subsequently the temperature was normal and the abdominal pain gradually subsided, slight tenderness remaining on deep pressure below the left ribs. On October 14th, eleven days after the injury, the boy had a severe attack of abdominal pain and the abdominal muscles were rigid; the attack subsided after an enema. On October 19th (16th day) the patient got up and on October 26th (23rd day) he left the hospital. On November 10th (38th day) the patient was brought up to the hospital by his mother. I happened to be there, examined him, and arranged for his immediate readmission. The mother said that immediately after his discharge

A diagnosis was made of effusion into the lesser sac due to injury of the pancreas.

The boy's condition being considered to be partly due to want of rest, he was kept in bed for three days. The temperature rose to between 100° and 101° F. each night. On November 14th the abdomen was opened through a vertical mesial incision above the umbilicus. The swelling projected forwards, having the stomach and transverse colon in front of and spread over it; a distance of only half an inch separated the adjacent margins of these viscera. The great omentum between the stomach and colon (so-called gastro-colic omentum) was scratched through, one or two large veins

FIG. 1.



from the hospital a swelling appeared in the abdomen and this swelling was gradually increasing in size. The boy had become much thinner. On examination he was weak and ill, pulse 120, temperature normal. There was a large prominent abdominal swelling occupying the left upper part of the abdomen, filling up the epigastric angle and extending below the umbilicus: its extent is shown in the photograph (see Fig 1). The swelling was dull on percussion, tense, and with a semi-fluctuating feel: it was somewhat tender. Pain of a shooting sickening character was complained of in the swelling and running round to the left side of the back. To the left and behind the colon could be detected, while the stomach lay above. The urine was normal].

being divided, the stomach was peeled up somewhat and the lesser sac opened: its wall was about one sixteenth of an inch thick and whitish on section. About four pints of yellow slightly turbid fluid were evacuated, together with much coagulated lymph contained in the fluid and adherent to the walls of the cavity. The dimensions of the cavity were those of the lesser sac; the pancreas was not defined. The edges of the sac opening were drawn out through the parietal wound and a small portion of the wall trimmed off therefrom, thus reducing the size of the cavity. The opening was then stitched into the parietal wound and the remainder of the latter was closed in layers. A large drainage-tube was inserted into the cavity.

Improvement after the operation was slow but

steady. The temperature reached normal at once, but the pulse remained somewhat rapid for a few days. The wound was dressed daily: as the discharge lessened and the cavity contracted, shorter and smaller tubes were used and the tube was left out on December 4th. On December 16th the patient got up, on the 20th the wound was healed, and on the 31st he left the hospital. He has since been well and I show him here to-day (Jan. 19th, 1905).

I examined a portion of the fluid at the Physiological Laboratory, University College, Cardiff. It had a faintly alkaline reaction, its specific gravity was 1.016, it contained a quantity of albumen and a trace of blood. It had a marked digestive action on starch but no digestive action on proteids. These facts are all consonant with its containing pancreatic secretion, the non-digestion of proteids being explicable by the fluid not having met with the succus entericus, for recent physiology teaches us that the pancreatic juice is only able to digest proteids after it has become mixed with the succus entericus, the latter secretion containing enterokinase, the "ferment of ferments" which has the power of converting the trypsinogen of the pancreatic juice into trypsin and so making the juice an active proteolytic agent (2).

Nature of the injury.—It is an interesting speculation as to what extent the pancreas is injured in these cases. Where the fluid from the sac not only possesses digestive properties but also contains altered blood it is a fair inference that the pancreas has been injured; but where, as in the present case, there is no blood in the fluid—the trace that was found probably coming from the incision in the abdominal parietes—it becomes a question as to how much injury, if any, the pancreas has sustained. Observers are not unanimous, but the majority agree that the presence in the fluid of a starch-converting ferment is evidence that such fluid comes from the pancreas. We must imagine that some small pancreatic duct is injured and through it some of the secretion of the gland reaches the lesser sac, exciting therein a serous peritonitis with effusion, the effused fluid and the pancreatic secretion mingling.

Where the swelling forms slowly and after some months or years the supposition is that, following injury, pancreatitis occurs which sets up peritonitis with effusion in the lesser sac. Where the swelling

forms quickly and at once direct laceration of the pancreas is indicated. Possibly there is a class of cases in which the peritoneum covering the anterior surface of the pancreas is torn without injury to the pancreas itself: to this class may belong a few cases in which the lesser sac swelling has apparently followed vomiting or some other form of straining (3). Certain cases in which the swelling forms very rapidly, reaches a certain bulk, and then remains stationary suggest the outpouring of fluid into a preformed sac. Adhesions present before the

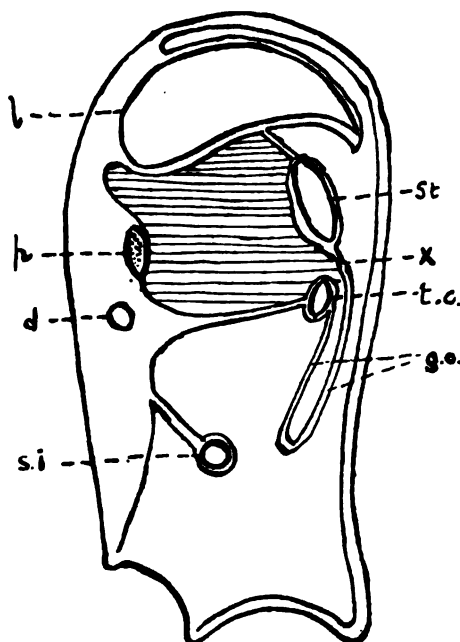


FIG. 2.—Diagrammatic vertical antero-posterior section through the abdomen, a little to the left of the median line. The lesser sac is shaded. l., Liver; p., pancreas; d., duodenum; s.i., small intestine; st., stomach; t.c., transverse colon; g.o., great omentum; x., place of opening the lesser sac.

injury, or set up by it, shut off the general peritoneal cavity at the foramen of Winslow and close that part of the lesser sac which lies between the layers of the great omentum. The diagram (see Fig. 2) shows roughly some of the relations of the distended sac in my own and in the majority of recorded cases.

The condition being thus regarded, it is not surprising that occasional cases of recurrence after incision, drainage, and healing are recorded, and that in a few instances a permanent "pancreatic fistula" has followed operation.

Diagnosis.—A case such as this sounds a note of

warning, bidding the surgeon be careful in his appreciation of the condition present after an abdominal injury. The boy improved during his first period of residence in the hospital and during that period there were no definite signs of intra-abdominal lesion. His detention was prolonged because of the general appearance of illness and the continuance of the abdominal pain with a marked remission on the eleventh day.

I have previously recorded (4) the case of a boy of the same age as the present patient who lived for eleven days after being squeezed between buffers, improving considerably during part of that time. His symptoms, with the exception of hæmaturia, indicating kidney-injury, were indefinite; a relapse took place after straining at stool and he died with symptoms of intra-abdominal hæmorrhage.

After death, liver, spleen, pancreas, both kidneys and omentum were all found lacerated; repair of all these injuries was taking place, and there had evidently been a possibility of recovery. The fresh hæmorrhage had taken place from the omentum.

A second case was that of a man on whom I operated for a tear one inch long completely through the wall of his jejunum, following a fall from a bicycle: the man was able after the accident to travel some distance by train and did not seek medical aid for four days (5).

The recollection of these and other similar cases further influenced me in keeping the boy in hospital for so long a period.

Effusions into the lesser sac due to pancreatic injury were formerly regarded as cysts of the pancreas and at the present time are sometimes called "pseudo-cysts." The diagnosis from true cyst of the pancreas is made largely by the history of trauma, such history being carefully sought for, for in some instances a long time, for example, three years in a case recorded by Dr. Pitt and Mr. Jacobson (6), has elapsed between the injury and the patient's coming for treatment. Usually, however, the swelling forms within a few days or weeks of the injury.

The swelling occupies the epigastric, umbilical, and left hypochondriac regions, as shown in the photograph (see Fig. 1), its most prominent point being in the last named region; the stomach and transverse colon can be detected in front of the swelling and the descending colon behind it and to its left.

The following are the principal conditions which may be confounded with effusion into the lesser sac.

(1) True cysts of the pancreas; no history of trauma.

(2) Cyst of the suprarenal; usually indistinguishable; may be signs of Addison's disease.

(3) Hydro- or pyo-nephrosis; colon in front (distend it); changes in urine.

(4) Cysts of spleen or liver; no band of stomach resonance separating swelling and liver (distend the stomach).

(5) Omental and mesenteric cysts; former indistinguishable, latter mobile.

(6) Retro-peritoneal cysts or abscesses; often indistinguishable.

(7) Ascites or ovarian cyst; when swelling very large; examine pelvic organs.

Treatment.—Equally with the use of an exploring needle as a means of diagnosis, aspiration is to be condemned as an attempt at cure. Cases are recorded where cure has resulted from aspiration, but the aspirating instrument may go through the stomach or the colon and at its best the method is uncertain, for emptying may be difficult or impossible, and after emptying refilling may take place.

Enucleation is impossible. Attempts at enucleating these swellings in the belief that they have been cysts or from some other mistaken diagnosis have often ended fatally. A portion of the wall may, however, be cut away as in my own case.

The proper treatment is by incision and drainage as already described. To do this in two stages is not necessary nowadays. Neither, when the anterior opening has been made, is it necessary to establish a posterior one for drainage: the cavity may, however, be approached and drained by a posterior incision below and parallel to the left ribs, the peritoneum being pushed forward, and this has been done in a few instances. During and after operation asepsis should be carefully maintained. Bearing in mind the possibility of recurrence, operators should keep their patients under observation for a long time after the operation.

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A LECTURE

ON

FIFTH NERVE NEURALGIA.

Delivered at the Medical Graduates' College and
Polyclinic.

By JONATHAN HUTCHINSON, Jr., F.R.C.S.,
Surgeon to the London Hospital.

GENTLEMEN,—The surgeon, in dealing with the question of neuralgia of the fifth nerve, is naturally interested mainly in those cases of severe neuralgia which are not amenable to medical treatment and the question as to the best methods of operation in such cases. At the same time, the answer to such a question should be based upon a scientific classification founded upon the causation of neuralgia or its pathology, and one must admit that such a classification at present is impossible. We can distinguish the pain due to errors of refraction from the more intense neuralgia caused by a peridental abscess, by a syphilitic node of the skull, and that accompanying an attack of herpes frontalis. And yet in the worst form of all, and the one of which I shall mainly treat, namely epileptiform neuralgia, I believe it is literally true that we know nothing as to its pathology and nothing as to its causation.

I would suggest to you the following rough classification as being useful: first, the cases of neuralgia due to blood conditions—to anæmia, to gout, to malaria—all of which may definitely cause a neuralgia. I am speaking in these two lectures entirely of neuralgia of the face and head. A second form of neuralgia is due to neuritis—for example, that accompanying herpes frontalis, etc., and that occurring with tabes dorsalis. In both the pain is due to a true neuritis. It has been proved in herpes frontalis that there is a neuritis affecting either the Gasserian ganglion or the main branches of the fifth nerve. In the case of tabes with neuralgia we can also prove a chronic neuritis. The third class includes those cases of neuralgia

referred to some local cause, such as carious teeth, an inflamed iris, a syphilitic node of the skull. These three forms of neuralgia, all of which go under the head of Neuralgia Minor, have definite causes, and the removal of the cause is of course the aim of the physician and the surgeon. In none of them is any operation on the nerves of any value as a rule, with the exception of such operations as destroying a nerve in connection with carious teeth, but no central operation is of any value in these forms of neuralgia.

The fourth class is that of epileptiform neuralgia—that is to say, neuralgia major,—in which neither a local cause nor a central condition can be assigned as a rule, and in which any attempt to remove a supposed peripheral exciting lesion is only disappointing and generally worse than useless, whereas, on the other hand, operation on the central part is followed by complete cure. Before passing to epileptiform neuralgia I would dwell for a few minutes on some of the forms of neuralgia minor.

We all know the neuralgia which accompanies eye-strain, that it is associated either with hypermetropia, presbyopia, or astigmatism, very rarely with myopia, and it is generally frontal and ocular in distribution. It is usually symmetrical; it is completely relieved by correcting the error of refraction. It is made worse by anæmia, by overstudy, and the like—in fact, by any condition weakening the general health, and it is never of a high grade. We know that iritis and acute glaucoma are attended with more intense neuralgia, and that neuralgia due to iritis and glaucoma is usually felt in the eye and in the forehead, but sometimes also in the temple. The severity of the neuralgia in glaucoma has often led the physician astray. There may be such intense headache and pain in the forehead and temple, accompanied by vomiting, that the case is diagnosed as one of bilious headache, and the essential iridectomy or the use of eserine is unfortunately neglected until it is too late to save the eye. Therefore I lay stress on the neuralgia which precedes or accompanies glaucoma and that which accompanies iritis. Neuralgia having an ocular cause is nearly always referred to the forehead. In neuralgia major or epileptiform neuralgia the first or ophthalmic division is least of all, and the last, to be affected. There is a prominent difference between the two pains.

A few words as to the neuralgia due to disease—whether suppurative or catarrhal—of the frontal sinus, the ethmoid sinus, the antrum of Highmore, and the sphenoidal sinus, but especially the frontal sinus and the antrum of Highmore. You are familiar with the fact that such a disease, set up by influenza or other cause, may produce a dull aching pain in the region of the sinus, referred perhaps to the forehead or the cheek, and of considerable intensity. Occasionally very severe disease of the antrum of Highmore may be mistaken for simple neuralgia, as in a case I heard of lately, where in India an officer became the subject of one-sided facial neuralgia of increasing intensity, and was treated in hospital with all kinds of sedative drugs, but without avail. He became steadily worse, being invalided home to England with the diagnosis of neuralgia. On the voyage he became hemiplegic, and when landed he was extremely exhausted. For the first time then the real cause of the neuralgia was ascertained—namely, suppuration in the antrum of Highmore. By the time he reached England it had spread up to the base of the skull, and had produced an abscess in the brain. He died in spite of operation. This is a case which I mention as a warning to point out the danger of overlooking this cause of intense neuralgia.

As a rule the neuralgia due to disease of the sinuses is not very severe before it is recognised.

Under the heading of Neuralgia due to Syphilis we meet with cases of considerable importance, because the cause is frequently overlooked at first. Such cases can be cured or greatly relieved by mercury or iodide of potassium, or both. I was once asked to examine, with my colleague, Dr. Schorstein, a man who was claiming damages on account of a contusion of the head which had been followed by persistent and intense pain, with loss of sleep and the occurrence of mental torpor. His pain was chiefly occipital, with radiations down the cervical spine; but he had headache also all over the head. The pain was worse at night, but it never entirely left him; his medical man had been treating him during several weeks with various sedatives, but without relief. The man had been prevented from working for some months, he was confined to his room and looked a complete physical wreck, whilst the only symptom he complained of was this intense cephalalgia. Examination of the eyes revealed no optic neuritis;

his knee-jerks were normal; there had been no vomiting nor sickness, but he was giddy when he attempted to walk, and had photophobia. To make a long story as short as possible, we found he also had a copious blotchy syphilitic eruption all over his body, and this had appeared within three weeks of the accident, which was a slight fall of some earth upon him while he was engaged in excavating a road. To that he attributed the whole of his symptoms. Six months had elapsed, and during the whole of that time he had had this intense headache and neuralgia. We gave evidence that they were due to secondary syphilitic cephalalgia, and he did not get any damages, but I trust he took a proper mercurial course instead.

A similar case was the following. A man was working in the docks and was struck by a rope on his head, but there was no abrasion of the skin. For four months after the accident he was attending Moorfields hospital with the diagnosis of iritis. He undoubtedly had slight iritis in both eyes, as shown by uveal deposits on the lens when I saw him at the end of four months, but his chief symptom was intense headache; for this he had been under the care altogether of six medical men. The headache was always worse at night, and it was both vertical and frontal. He was receiving compensation from the dock company during the whole of this time, but as he did not improve Dr. Findlay sent him up to me. Unlike the previous case, there was no syphilitic eruption to be found, nor was there a history of chancre of the penis, but you know how difficult such a history is to obtain from some patients. I was positive it was syphilitic cephalalgia, for the following reasons: He had double iritis, and uveal deposits in both eyes. For a man to have double traumatic iritis from a very slight concussion is very improbable. He had a definite bald patch on the dorsum of his tongue, with a small ulcer, which was typically syphilitic, a chronic enlargement of glands on the right side of the groin and both sides of the neck; and these symptoms, taken with the double iritis and headache, were sufficient to make the diagnosis certain. He was urged to take a proper mercurial course. Neither of these cases had had any antisyphilitic treatment when I saw them, and both were examples of secondary syphilitic neuralgia.

Of the severe neuralgia which occurs in tertiary

syphilis I hardly need to give you instances because they must be so familiar. Sometimes there is a node outside the skull with a tender soft spot; sometimes there is diffuse osteitis involving the whole thickness, sometimes, the most puzzling of all, there is a gummatous node on the inside of the cranium with nothing to show for it outside. Those nodes may occur anywhere on the skull; they are known to develop even at the base, but they are most common in the frontal region.

The most terrible neuralgia I have seen from tertiary syphilis was in a man who had aggressive necrosis of the whole base of the skull. He had lost all his palate, the nasal septum, the turbinated bones, the ethmoid, and most of the sphenoid. One could almost see the dura mater at the base of the skull. It was the most obstinate case as regards treatment that I have ever seen. In spite of all kinds of mercurial and iodide treatment only partial improvement could be obtained. Iodide in large doses was the most effective, but it caused considerable depression. He had very severe neuralgia on both sides of the head; the pain prevented sleep for weeks together. He improved after operation for removal of the sequestra, and after an accidental infection with erysipelas. I quote this case as being the worst one of tertiary neuralgia I have ever seen. No doubt he had meningitis at the base, spreading to the cavernous sinus. And that leads me to mention that the pathology of some of those cases of neuralgia in tertiary syphilis, with paralysis of one or other oculo-motor nerve, has been considerably elucidated by a post-mortem which years ago I was fortunate enough to obtain on a case which Dr. Robinson, of the Whitechapel Infirmary, had under treatment, and which he was kind enough to ask me to see. The patient had absolute fixation of one eye; he had complete paralysis of the pupil and ciliary muscle, and had also very marked neuralgia on the fifth nerve on the same side. The man died from another cause, and we were able to get a post-mortem examination. The appearances were very striking. Sections of the cavernous sinus showed the carotid artery to be greatly narrowed, the sinus obliterated, and acute neuritis existed in all the nerves in its wall. There was a small gumma of the temporo-sphenoidal lobe just in contact with the wall of the cavernous sinus from which the process had spread. I have had the opportunity of observing other cases

at Moorfields in which a similar ophthalmoplegia and neuralgia over the whole of one side of the head cleared off entirely under the administration of iodide of potassium, and in which I think the pathology was probably inflammation of the wall of the cavernous sinus.

With regard to the neuralgia associated with *tabes dorsalis* I cannot do better than refer to Dr. Buzzard's observations of twenty years ago. Dr. Buzzard pointed out the important relation which exists between facial neuralgia and *tabes*. He said that the first symptom of *tabes* might be severe shooting pain in the fifth nerve area, and he concluded an admirable account of the subject by saying that flying so-called neuralgic pains in the head when they attack both sides and do not map out the district of one or other division of the fifth nerve, should lead to a careful examination for other symptoms of *tabes*. Tabetic neuralgia seems to be either symmetrical or roughly so, occurring on one side first and then on the other.

As to the numerous cases of neuralgia due to dental causes, time does not permit me to enter into details; but I would point out that true epileptiform neuralgia has little or no relation to any disease of the teeth. In practically every case of epileptiform neuralgia when it comes to the surgeon the teeth, whether healthy or diseased, have been removed from that side, but no relief has followed, and there has been no reason to suppose it was started by tooth trouble. Minor neuralgia due to dental irritation, whether it be a carious stump, the injudicious stopping of hollow teeth, or to surface erosion, is a different affair to the epileptiform variety, though the two may be confused.

As to the treatment of minor neuralgia, of course everything depends upon the recognition of the cause. In the syphilitic form the iodides have a wonderful action. Sometimes, however, mercury is better, but as a rule neuralgia occurs in late syphilis, and the iodides are better. Iodides may also be of use in other cases because of their influence in lowering blood-pressure. I need hardly mention that quinine is of great value in some cases where the cause cannot be recognised easily, and perhaps the hydrobromide and salicylate are the most useful forms. Cannabis indica, gelsemium, and morphia, are frequently given, and it is unfortunate that the dangers attending them so largely counteract their utility. At any rate, as

regards the administration of morphia for any form of neuralgia, whether severe or of minor degree, we hold with Krause that it should be entirely banished from the therapeutics of the disease. The risk of establishing the morphia habit is so great that the mere palliation of pain in the grave cases is not justifiable. In one case of epileptiform neuralgia recorded by Professor Billroth, before the end came the man was taking half an ounce of morphia hypodermically every day; and you can imagine what condition he was in!

The morphia *habitués* lose appetite entirely, get thin and flabby, degenerate, and become mere wrecks, and nothing is more painful than to see a man who has become the victim of morphia given for neuralgia.

I have no belief in freezing the skin with chloride of ethyl spray for neuralgia, and hardly any more faith in injecting osmic acid into the nerve-trunks, but I have no practical experience of the latter. Often warmth—dry heat—is useful, and in some cases electricity or galvanism may do good. The inunction of sedatives is more likely to be useful, especially menthol and aconitine and some other drugs.

Now to pass to epileptiform neuralgia, or neuralgia major. A few statements about it will save you a long description of the symptoms and progress of the disease. Epileptiform neuralgia is almost invariably unilateral. This diagram on the wall shows you the area of the pain in a typical case of an advanced degree. Of course cases differ in this respect, but the diagram is of a fairly characteristic one. There is intense pain along the deep coloured part, especially along the lower jaw; there are tender spots at the upper lip, over the infra-orbital margin and over the supra-orbital foramen. There is severe pain all over the cheek and eyes, and inside and outside the mouth and the corresponding side of the tongue. There is also a mild radiating, or referred pain as far back as the occipital protuberance. Thus it will be seen that not only the fifth nerve is concerned but often the superficial cervical plexus (to a much slighter degree). The pain is usually concentrated in the inferior maxillary and superior maxillary divisions. The other diagram is from the same case after operation, showing the area of anæsthesia left by complete extirpation of the Gasserian ganglion. The anæsthesia went strictly to the middle line, and did

not include the masseter region, because this region is supplied by the great auricular or the next branch of the superficial cervical plexus. It also includes a part of the ear. The neuralgia is absolutely unilateral, differing in that respect from many cases of minor neuralgia. It commences in the distribution either of the second or the third division of the fifth nerve, and it tends to involve, sooner or later, both to the same extent. Finally the ophthalmic division, so frequently concerned in cases of minor neuralgia, is involved comparatively rarely or slightly in true epileptiform neuralgia. The attacks of pain are paroxysmal or spasmodic; they tend to increase steadily in severity, while the intervals of freedom from pain are shorter between each attack. During each attack there is spasm of the facial muscles on the affected side. There is no cause known, though it is observed that certain acts on the part of the patient, such as talking or eating, will bring on the attacks, possibly also exposure to change of temperature. The subjects of the disease are almost invariably adults between thirty and fifty years of age at the onset, and males are more liable to suffer from it than females. Its progress is one of steadily increasing severity, and spontaneous cure of the condition is practically unknown. There is one case which Billroth recorded of spontaneous cure, but the total number of such recorded cases could, I think, be counted on the fingers. Medical treatment, with the exception of dangerous doses of morphia, has little or no effect, and partial or complete removal of the Gasserian ganglion seems to be the only real cure of a permanent character. Such are the characteristics of epileptiform neuralgia. In the very earliest stages—I have a case under observation now which I think will steadily develop, though I hope only slowly—the pain may be absent for weeks at a time. It will then perhaps be produced by lightly touching the skin with the finger or handkerchief, or by that part of the face resting on the pillow at night, for if the patient sleeps on the opposite side no pain may be produced. Each attack becomes worse and the intervals become shorter until, in Billroth's graphic words, "the patient may be emaciated to a skeleton, with a rigid staring expression, with the saliva dribbling from his open mouth, with long unkempt hair, constant spasm and convulsive movements of the facial muscles on that side." In addition,

especially if he has resorted to opium or morphia, the patient will get into a condition of mental degradation. A question which has been much discussed is whether epileptiform neuralgia has any relation to true epilepsy or to insanity. Undoubtedly many of the cases do terminate in suicide. Some of the cases of suicide which are not explained in people who otherwise have reason to enjoy life are undoubtedly cases of this neuralgia. They get worn out by their sufferings and commit suicide. But that, of course, does not really prove the existence of insanity. There is no reason whatever for thinking there is any relation between epilepsy and true epileptiform neuralgia, except the occurrence of spasmodic attacks in both. If you go into the family histories of cases of epileptiform neuralgia, you will find there has been no special tendency to epilepsy, and as a rule there is no history of any tendency to special nerve trouble, such as a neurosis. Some of the sufferers from epileptiform neuralgia are men working at ordinary day labour who never use their brains more than they can help, and others are men in the highest positions in the intellectual world, who live by their brain-work alone. As far as one can gather, the disease is especially prevalent in the United States; the number of cases reported as occurring there is extraordinary. But almost every European country seems to contribute its quota of sufferers. I should like to know what its prevalence is in India and other tropical countries, and it would be interesting to know its relative frequency in various races. In the United States I believe it occurs chiefly amongst the white population. It seems to be equally common in England, France, and Germany.

The local distribution of the neuralgia—that is, as to the part of the fifth nerve involved—is very important. For example, I analysed sixteen cases which are elaborately recorded by Italian surgeons as being typical, and out of the sixteen all three divisions of the fifth nerve were concerned in only four cases. In two cases the second division alone was concerned, and in one the third. In the remaining nine cases the neuralgia affected the second and the third divisions only. The neuralgia may start, then, in the superior maxillary or in the inferior maxillary division. It nearly always, after existing a certain time in one, involves the other, and, to a less extent, the frontal division,

and sometimes branches of the superficial cervical plexus.

We come now to the question whether there is any real pathology of epileptiform neuralgia, and here I feel on delicate ground. Some distinguished authorities, such as Professor Keen of America and Sir Victor Horsley in this country, say there is sometimes a neuritis; and Dr. Spiller, who has examined several of the ganglia for Professor Keen, describes in detail certain changes. Well, on the other side one would put the observations of Billroth, who had case after case examined and found that the nerves removed were absolutely normal; he found no neuritis and no sign of any inflammation anywhere. Several Italian authorities on the subject have examined the Gasserian ganglia which have been removed, and found no changes whatever. Dr. Henry Head kindly examined the Gasserian ganglia of cases of my own which had been removed and I had drawings made, and they were absolutely normal. The blood-vessels, the ganglion cells, and the interstitial tissue were quite natural and there was no trace of neuritis anywhere. Dr. Crawford Renton of Glasgow has examined several, and with the same result. Those who say there is inflammation in the Gasserian ganglion differ amongst themselves as to the changes which are supposed to be present. For instance, one observer describes an endarteritis of the small blood-vessels. That certainly is absent in most of the cases, and if it is absent in most how can it be the cause of the neuralgia in all? There is no special tendency to atheroma in these patients in other arteries, and I do not believe that epileptiform neuralgia has the slightest relation to sclerosis of arteries or disease of any blood-vessels in the ganglia or in the nerves. Spiller describes swelling of the axis cylinders, but another authority says the axis cylinders are healthy and that it is the myelin-sheaths that are diseased. Some say the changes lie in the ganglion, some that there is disease of the blood-vessels, others of the main nerves; and my conclusion is that there are no definite changes. It is true that there may be microscopical degeneration found in connection with the Gasserian ganglion; but remember many of these cases have had one, two, or even half a dozen operations performed on the main nerves just below, and surely ascending changes are not unlikely to follow such repeated operative interference.

One is driven to the conclusion that there are no lesions yet discovered which account for epileptiform neuralgia. I think it is much fairer, if it is so, to recognise the fact and state it than lay stress on very minute and varying microscopical changes which have been found by a few observers. A true pathology may be found in the future, but at present the evidence on the matter is entirely conflicting. Think of the cases of neuritis with tabes; in these we find anæsthesia with the pain. Think of the cases, such as I have quoted, of neuralgia with disease of the wall of the cavernous sinus; here oculo-motor paralysis is constant.

In epileptiform neuralgia, though it may last thirty or forty years, there is neither anæsthesia nor motor-paralysis. Any gross change, therefore, in such a disease is very unlikely, though slight degeneration at the end of such a long time is possible.

I would next refer to a series of interesting cases of tumours connected with the Gasserian ganglion, and I do so partly in order to note the fact that the earliest case of the kind clearly described was an English case. It is from Dr. Robert W. Smith's book on Neuroma. He includes under the term "neuroma" cases which undoubtedly we should now call sarcoma; and this, no doubt, was an example of fibro-sarcoma, or sarcoma of the Gasserian ganglion, perhaps starting from the fibrous sheath of the ganglion. The patient was a female, æt. 40 years, suffering from terrific pain on the right side of the face. Her sufferings were much increased by attempting to talk or to take food. There was no respite during the day, and at night she seldom had relief, nor did any drug treatment afford her temporary ease. "After having endured more severe and uninterrupted pain than I have ever witnessed in any other instance, death terminated her protracted agony four months after admission to the hospital." A tumour was found, and from the description of the structure it is evident that it was one of sarcoma.

I have collected all the cases of tumour involving the Gasserian ganglion which I have found recorded. One I operated upon myself; it was an ossifying chondroma or chondro-sarcoma growing from the petrous bone. The patient was under the care of Dr. Head, who did not regard the case as one of genuine epileptiform neuralgia. We thought it was best to explore, and I performed

Krause's operation, and found a tumour involving the Gasserian ganglion, which was mainly cartilaginous, and I was able to remove a good deal of it without causing serious bleeding. The operation relieved intra-cranial tension, but the relief was probably only temporary.

Amongst the other cases of tumour involving the Gasserian ganglion some have been endotheliomata, others sarcoma. These cases are rare, but they are particularly interesting, because they have caused intense neuralgia, but not as a rule so typically epileptiform as the ordinary cases. But in every case of tumour there is either anæsthesia, or the oculo-motor nerves are involved, so that one can diagnose them fairly early from true epileptiform neuralgia. In some cases the tumour has spread forward into the orbit quickly and caused proptosis; but in other cases, as in mine, there was no proptosis, though there was paralysis of one or other of the oculo-motor muscles.

A few words about the medical treatment of epileptiform neuralgia; they need be few, because, unfortunately, it amounts to about nothing. Morphia undoubtedly relieves, but it is necessary to give increasing doses. Some of the patients get into the habit of injecting almost incredible amounts, and the mental condition resulting therefrom can be readily inferred! All forms of electricity, and of course the X rays, have been tried, but I am sorry to say that the results are negative; no form of electricity has been found to cure a definite case of epileptiform neuralgia. It is curious that in the old days very free purgation was said to be useful, but it has gone out of fashion. Belladonna had a certain reputation, but Trousseau who has discussed the subject elaborately, found it to be useless on the whole. Sir Victor Horsley says he has only seen marked benefit from tincture of gelsemium pushed to poisonous doses, and I need not add any comment to that.

When contemplating operative treatment one has to carefully except those cases which are of neurasthenic or hysterical nature. I have seen one such in a working woman, who was worn out by repeated pregnancies coupled with bad feeding and overwork. In her I am sure the pain was not true epileptiform neuralgia, although it came on in spasmodic attacks. There is nearly always something anomalous about these cases of hysterical or at any rate false epileptiform character. It is true

that this woman I am referring to had explosive attacks of neuralgia in the face, which had been going on for some years; but the pain would last for days continuously, and sometimes there would be numbness and pain on the whole of one side of the body. That was unlike true epileptiform neuralgia, and one would not dream of operating upon such a case. She improved under the administration of iron and general tonics. I have seen a case in which epileptiform neuralgia was accompanied by a homicidal tendency and great depression. The neuralgia was never severe, and the attacks did not get worse. It was simply that he had constant pain, and every now and then there was an intense exacerbation and it looked as if he were going insane. He did not take morphia at all. As he had marked tenderness over the frontal sinus, one thought that there might be some cause for the pain there, and trephining was accordingly done, but nothing abnormal was found. Later on my colleague, Mr. Tod, did an operation on the upper cavities of his nose, and he was neither better nor worse after it. I saw him two years after that and he was still in the same condition. I am sure the case was of cerebral origin, it was not in the fifth nerve, and it was not true epileptiform neuralgia.

Again, one must exclude cases of minor neuralgia in which the major form of the disease is simulated. I heard of one case in which an operation had actually been planned for excision of the ganglion, but it was decided to try the effect of removing a tooth which had been stopped. After that procedure the neuralgia was entirely cured. Such cases are, however, very rare, and as a rule in long-standing cases the diagnosis of epileptiform neuralgia is easy and certain.

In the next lecture we will discuss the actual operation and the results which may be expected from it.

The Blood in Puerperal Infection.—Potocki and Lacasse record a number of personal observations from which they conclude that the prognosis must be considered doubtful in the presence of a leucocytosis of over 25,000 to 30,000, with an abnormal percentage of polynuclear leucocytes and decrease or disappearance of eosinophiles. In regard to treatment, they would reserve laparotomy, followed by hysterectomy, if necessary, for severe cases in which eosinophiles are absent.—*Amer. Journ. of Obstetrics*, March, 1905.

ON NUTRITION AND MALNUTRITION.

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(*Continued from page 381.*)

I PROPOSE next to consider a little more in detail the changes undergone during digestion and subsequent absorption of the different alimentary principles. It will be found that the general result of the hydrolysis is to convert the ingested substances into bodies somewhat less complex in character, but becoming at the same time more diffusible. Such changes, therefore, are destructive or analytic in nature. Inasmuch, however, as it is most certain that the materials as presented for assimilation by the bioplasm are not (with few exceptions, chiefly among the inorganic ingesta) in the form in which they occur in the food, nor even as they are after undergoing digestion in the alimentary canal, some further changes must be undergone by them, somewhere between the surface of the gastro-intestinal epithelium and the living cell into which they will be incorporated, and these changes for the most part are of a synthetic character. Whatever may be the nature of the agencies by which these latter changes are effected, it may be said that those which take place in the alimentary canal are fairly well understood and are capable of more or less exact imitation in our laboratories by well-recognised chemical methods, whilst those changes which commence with the gastro-intestinal epithelium, though possibly and even probably of the same nature, are not so readily imitated by the means at present at our disposal, and that with the absorption of the digested material the direct influence of living protoplasm is for the first time brought to bear on the aliment. At the same time, it is admitted that the digestive processes themselves are affected by the products of bioplastic activity—viz. the ferments—and it may well be that after all the subsequent elaboration of the nutriment is affected by similar agencies.

THE DIGESTION, ABSORPTION, AND DESTINATION OF PROTEIDS.

First as regards proteid digestion. In whatever form these bodies are presented to the digestive

organs, whether as albumins, globulins, fibrins, etc., they are converted into a diffusible condition by the pepsin of the gastric juice acting in association with hydrochloric acid, and by the trypsin of the pancreatic secretion in the presence of an alkali. I am not now concerned with the different views taken as to the nature of the several stages of decomposition which these proteids undergo: it is sufficient for my present purpose to understand that it is mainly into albumoses and peptones that proteids are converted. Whilst we are ignorant of the exact composition of the different members of this group, it is impossible to say precisely how the peptones differ in their chemical structure from the proteids whence they have been derived, nor what different kinds of albumoses and peptones there may be. It is by their physical characters that they are distinguished, by their non-coagulability, by their differences in diffusibility—*i. e.* size of molecule—and in precipitation by ammonium sulphate, as also by their fractional heat coagulation.

Although it is the case that in the normal process of proteid digestion the hydrolysis by the gastric ferment does not proceed beyond the stages of proteoses and peptones, and that a much further cleavage takes place by the action of trypsin, whereby a large proportion of the ingested proteids are ultimately decomposed into much simpler crystalline substances, represented by leucin and tyrosin, glycerol and other amido-acids, as well as lysine, lysatine, and a body called tryptophan, it is not to be supposed that the difference is other than one of degree, for under certain artificial conditions outside the body the pepsin action may be made to effect very nearly the same ultimate results as the pancreatic enzyme. It may be observed, however, that the extent to which the peptones and albumones are further split by the trypsin is much greater when those bodies have been formed by gastric digestion than when the pancreatic ferment works straight away upon native proteids. This, so to say, natural trend of the proteolytic enzymes is an important fact. If also it is recollected that neither proteoses nor peptones are to be found in the portal vein, and that if such bodies gain entrance to the circulation, they are at once eliminated by the kidneys, and also that the amido-acids are not found in normal fæces or urine, the question of the form in which the proteids are absorbed into the circulation comes to assume one of considerable

interest, if not difficulty. At least it cannot be that the general character of the changes which intervene between the proteids as ingested and as they are ultimately presented to the bioplasm consist merely in a series of transformations among closely allied bodies, such for instance as is in great measure the case in connection with the carbohydrate digestion and assimilation. The changes in the proteids clearly extend over a much wider range than that; and further, having regard to the fact that the proteid constituents of the tissues are by no means identical with those taken as food, it is clear that synthetic processes of an extensive character are involved. At first sight it would appear that a decomposition of the nitrogenous aliment into bodies so much less complex as the amido-acids are, as a preliminary to their reconstruction into tissue constituents of even greater complexity, is a wasteful exhibition of energy, but a comparison of the calorie value of these amido-acids with that of the proteids from which they have been obtained shows that only a very slight loss of energy has been sustained. Some of the difficulty in connection with this subject has been cleared up by the discovery by Otto Cohnheim of a ferment in the cells of the intestinal epithelium, to which he has given the name of "erepsin." By this agent the albumoses and peptones which are absorbed are split up into cleavage products such as amido-acids, in which form the bulk of the nitrogenous ingesta passes into the blood and so to the liver.*

That the end products of tryptic digestion can be made available in the economy is shown by the fact that dogs in a state of nitrogenous equilibrium if fed on these bodies will still maintain that equilibrium, showing that proteids need not retain their characteristics to be available as food, and that their cleavage products can supply the essentials for tissue nutrition. In those conditions where a transference of the proteid constituents of some tissues to others takes place it seems probable that their passage takes place in the form of cleavage products, and not actually as proteids. Such, for instance, in starvation, when a great loss of the systemic muscles occurs, and also of glands rich in proteid matter, whilst but little loss takes place in

vital organs like the heart, the muscular tissue of which is maintained at the expense of these other structures. To effect this transference of proteids from one tissue to another, it is clear that they must be rendered soluble and diffusible—in other words, digestible, and the wide distribution throughout the tissues of proteolytic ferments, and also, as Dr. Vernon has shown, of erepsin ('Journal of Physiology,' December, 1904) would seem to suggest that it is by their agency, as in the intestine, that the change is effected. Support for this view is also to be found in plants, since "in vegetable metabolism the amides have been shown to be antecedents of proteids, or to take part in its construction, disappearing from the cell as proteid is formed" ('Ferments and Fermentation,' by Prof. Reynolds Green, F.R.S., 1901).

There has always been a considerable difficulty in accepting the view that the absorbed peptones and albumoses were re-transformed into coagulable proteids, such as serum globulin and serum albumen, in their passage through the villi to the blood-current; for, among other reasons, it is known that in starvation the circulating proteids in the blood are but very slightly diminished in amount, in marked contrast to the decrease of the tissue proteids, and were the former the nitrogenous pabulum they would be expected to disappear; moreover, neither of these circulating proteids correspond to the actual proteids of the tissues, in each of which a further special transformation would have to take place. But with a preliminary decomposition of the proteids into bodies of an altogether simpler character, there is presented to each living unit the raw material, so to say, out of which each can synthesise for itself its own special constituent, and this without, as already said, any material loss of potential energy. Further than this, there is some reason to believe that the proteid cleavage may proceed in the intestines, beyond even the formation of the amido-acids, even to the splitting off of the nitrogen and formation of ammonia, and this would account for the large excess of ammonia which is found in the portal blood. It is not suggested that more than a small quantity of the proteid is split up to this extent, and the non-nitrogenous moiety of the molecule probably serves as fuel in the course of the subsequent metabolism.

Although this account of the changes undergone by the proteids in the intestine represents the most

* Dr. Vernon ('Journal of Physiology,' December, 1903) has shown that the pancreatic secretion also contains erepsin, which is quite distinct from the trypsin and that it differs somewhat from the intestinal erepsin.

recent views on the subject, there have lately been made some observations, which, so far as they go, are in the direction of supporting the older views. It has for long been known that a milk-curdling ferment (rennin) is secreted by the stomach, and more recently it has been shown that a similar body is found in the pancreatic fluid. Besides its specific action upon the caseinogen, it also has an action on the albumoses and peptones which it meets with in the intestine, altering them in such a manner as to increase the size of their molecules, and so forming a colloidal body, to which the name "plastin" has been given, that is intermediate between the albumen and the albumose, and in an alkaline medium resembles a coagulable proteid and so differs from peptones. That is to say, there is here a synthetic change tending to raise the less complex, more coagulable albumose to a higher stage of complexity towards that which obtains in the actual proteid construction of the tissues. Considerable difficulties surround the subject, not the least being the mode in which the absorption of this substance takes place, and the doubt already referred to concerning the circulating proteids being assimilated by the protoplasm. May it be that the occurrence of rennin in the stomachs of birds and fishes, where no milk-curdling takes place, is connected with this additional action?

If now we endeavour to follow so far as we can the destination of the digested proteids, we are at once struck by the fact already mentioned, that, if they be presented for absorption as albumoses and peptones, these bodies are not to be found in the blood of the portal system, far less in the general circulation. Moreover, such bodies are extremely toxic in character, and should they under any circumstances find their way into the blood-current would be eliminated by the kidneys at once. Somewhere, then, in the passage of the digested proteids through the columnar epithelial cells, or in the lymph of the underlying lymphoid tissue, whence they are absorbed into the portal blood, they are reconverted into coagulable proteids possessing no characters at present distinguishable from those of the normal blood. Everything points to this change, if it really occur, taking place in the epithelial cells. If, on the other hand, it is in such form as leucin and tyrosin that the digested proteids are absorbed, their passage

into the blood offers no difficulty, but at the same time no special excess in the quantity of these substances is found in the portal vein, which is explained by the advocates of this view as being due partly to the difficulties connected with the quantitative estimation of these bodies in such fluids as blood, and partly to the relatively small quantity existent at any one time and the rapid disposal of it by the liver.

In passing, it may be pointed out that a considerable difference exists in the extent to which the various proteids of the food are absorbed, dependent, no doubt, in great measure, if not wholly, on their digestibility (in the absence of any evidence to indicate a selective power of absorption by the epithelium). Thus, vegetable proteids, probably from their association with cellulose and other materials, are commonly less well absorbed than those of animal source, though by no means in all cases, and even among those of animal origin differences exist. At the same time, it may be remarked that native proteids are capable of some absorption without change, and a still larger amount of alkali and acid albumen may be taken up without previous conversion into albumoses or peptone.

Passing on in the portal blood, the liver is reached, and the next question is, What changes, if any, do the absorbed proteids undergo in that organ? On the more generally held view that the albumoses and peptones are reconverted by the intestinal epithelium into such proteids as are normally found in the blood, it is held that "the great part of the proteid which is absorbed from the intestine passes on through the hepatic veins into the general circulation without being stored or at once modified in the liver" (Schafer: *'Text-Book of Physiology,'* vol. i, p. 902, 1898). If, however, it is in the simpler form of such bodies as the amido-acids and their allies that the digested proteids reach the liver, then it would seem probable that certain synthetic changes—comparable to those taking place in the kidney-cells by which benzoic acid and glycoll are synthesised into hippuric acid—are effected in a portion of them by the hepatic cells preparatory to their being assimilated by the protoplasmic molecule. On experimental grounds it is probable that the greater part of the amido-acids are converted into urea in the liver; and if, as has been said, the bulk of the ingested proteids are split into

these and allied substances during digestion, and in the intestinal epithelium, then it would appear that the ordinary nitrogenous intake far exceeds the requirements of the body, and gives support to the view which Chittenden's experiments indicated. Of the importance of the liver in the metabolism of proteids, and strongly confirmatory of the view that it is as comparatively simple cleavage products that the digested proteids reach that organ, is the fact that in acute and extensive destruction of the liver-cells, as occurs in phosphorus poisoning, yellow fever and the like, leucin and tyrosin are found abundantly in the urine, being thus excreted, it may be reasonably supposed, since the liver had been unable to deal with them as it does under normal circumstances. Thus the function of the liver in this case resembles that in respect to the absorbed glucose, being to intercept the products of proteid and of carbohydrate digestion and either store them up as glycogen or synthesise the nitrogenous bodies into less diffusible albumens and globulins, and so retain them in the economy, and on failure of hepatic function they would pass on unaltered and be excreted by the kidneys as sugar and amido-acids respectively.

The solution of the problem which concerns the mode in which the proteids are actually disposed of by the living tissues will depend in some measure upon our knowledge of the precise form in which these substances are presented for assimilation. Of the views most generally held hitherto, one is, that whilst a portion of the absorbed proteids is ultimately incorporated into the bioplasm, forming the so-called "tissue" (Voit) or organised proteid whereby its growth and maintenance are effected—making up, that is, for the wear and tear—a large proportion never becomes an integral part of the living molecule which by contact—or as we should now say by ferment action—induced in this so-called "circulating" (Voit) or unorganised proteid catabolic changes akin to those determined in the fat and carbohydrate which are also associated in the protoplasm. By Pflüger, however, and with perhaps the more general support of physiologists, the whole of the proteid intake was considered to become bioplasm, leading to increased growth and metabolism of this material with production of body heat, of which the muscles are the chief source. If, however, the nitrogenous pabulum is presented to the bioplasm in a simpler condition than that

represented by serum globulin and serum albumen, as we have seen reason to believe may be the case, in such a form as leucin, tyrosin or allied substances, then a greater range of synthetic change is called for on the part of the living matter to render such bodies an integral part of itself.

The subject of proteid catabolism is one of exceeding complexity. Without doubt the most abundant nitrogenous waste substance is urea, and the amount excreted varies directly with the quantity of proteid food. Inasmuch also as the muscles form the great bulk of the proteid tissues, it is from their waste that the greater quantity of the urea is derived. At the same time, however, it is pretty certain that the urea is not formed in the muscles, but in the liver, which thus becomes an organ concerned in the catabolic processes of nutrition as it is with the anabolic processes that I have before said are to be regarded as in great measure coincident and mutually related. From this it would follow that some or all of the products of the disintegration of muscular tissue in the exercise of its function must be conveyed to the liver, there to be converted into the urea which is excreted. These substances are included under the general term of "extractives" and consist of creatin and creatinine, uric acid, xanthin, hypoxanthine, etc. Neither of these bodies, however, is the immediate precursor of urea, the actual substance being a compound of sarcosolactic acid, a constant result of muscular action, and of ammonia which is another product of the same. The ability of the liver to form urea from certain ammonia salts has long been known, and there is very little doubt but that it is in this manner that the muscle waste is disposed of so far as the nitrogenous part is concerned, the non-nitrogenous portion forming, as will be immediately seen, a carbohydrate, and finally eliminated as carbonic acid and water. That a large proportion of the urea excreted is formed by the liver from the leucin and tyrosin, which have resulted from proteid digestion, has already been mentioned.*

Another important product of proteid decomposition is uric acid, concerning the origin of which, under normal and abnormal conditions, most diverse opinions have been held. Here it will suffice to say that its origin, as that of other purin

* A ferment—argenare—has been found in the liver and other organs by which argenin, one of the products of proteid cleavage, is converted into urea.

bodies, is to be found in the metabolism of the nucleo-proteids, and hence it is a product of nucleated cell activity such as occurs in secreting glands and the white cells of the blood.

THE DIGESTION, ABSORPTION, AND DESTINATION OF CARBOHYDRATES.

Having thus traced the proteid elements of the food from their ingestion to their presentation to the living cell, it now becomes necessary to pursue the same inquiry in respect to the carbohydrate food-stuffs. Here the subject is somewhat easier, though much still remains to be learned. In whatever form these constituents of the food are offered, whether as starch, dextrin, gums, or as cane-sugar, milk-sugar, or maltose, they are only assimilable in the form of glucose (dextrose, levulose, etc.), and for the most part are absorbed into the blood in this form. Should such substances as cane-sugar or maltose gain entrance as such into the blood, they are excreted by the kidneys and are not made use of. Inasmuch as the greater part of our ingested carbohydrates is in the form of starch or cane-sugar, it is clear that during their course through the alimentary canal they must undergo certain changes which result in their conversion into the glucose form. The nature and agency of these changes are fairly well understood and are briefly a succession of hydrolytic actions, effected in the case of polysaccharids ($C_6H_{10}O_5$)_n such as starch by the diastatic or ferment action of (a) the salivary ptyalin which is carried on almost entirely in the cardiac portions of the stomach, unless the act of chewing be excessively prolonged; and (b) of the pancreatic amylopsin, by which the bulk of the material is converted into the disaccharid ($C_{12}H_{22}O_{11}$) maltose, and subsequently the conversion of the maltose into the monosaccharid ($C_6H_{12}O_6$) dextrose by the inverting ferment of the succus entericus, and, as appears to be very probable, by the action of the intestinal epithelial cells during the passage through them of the absorbed material. The ingested disaccharids will, of course, only undergo the inverting action, a small amount of which may be affected by the acid of the gastric juice (comparable to the action of dilute mineral acids on cane-sugar or maltose in the laboratory), as was shown by Ferris and Lusk ('Amer. Journ. of Physiol.,' 1898), the latter of whom has lately proved the absence of a cane-sugar inverting

enzyme from the gastric juice (*ibid.*, February 1904).

As with the digested proteids, so the digested carbohydrates are absorbed by the epithelial cells of the small intestines and to a much lesser degree by those of the stomach, the rate of absorption being influenced by various circumstances, such as the degree of concentration, the rate of the blood-current, and so on. I have just mentioned that these cells most probably exert an effect on the maltose, changing it into dextrose, as there is reason to believe they modify the other products of digestion as they pass through them.

By the portal vein the dextrose is conveyed to the liver, where it is partly reconverted by a process of condensation into a polysaccharid, glycogen, and stored as such in the hepatic cells; some passes through the liver, and is laid up in the tissues, more especially the muscles, also as glycogen, though a considerable proportion, as will be seen, is converted into fat. It is further supposed that, in addition to these destinations of the dextrose, some enters into the construction of certain of the proteids and nucleo-proteids, forming within the molecule an atom-group of the nature of a hexoglucose, the basis of what I referred to in my previous lecture as the glucoside theory of proteid constitution. Dr. Pavy has strongly adopted this view, and has shown that from many proteids—though not from all—a body of glucose character can be obtained on treatment with caustic potash, as it was previously known could be effected by dilute acids. That such a notion as to the destination of part of the carbohydrate intake is highly probable might be inferred from the fact that within the body the proteids—or at least some—are the source of some of the carbohydrate nutriment. It is well known that glycogen continues to be formed in animals who are fed on a diet absolutely free from carbohydrates and it is certain that the fat is not the origin of this substance; there remains only then the proteid aliment as a source. Some of this proteid-derived carbohydrate, like that ingested, may be stored up as glycogen, and some may be circulated as dextrose and consumed without condensation into glycogen. That plants such as yeast-cells may synthesise proteid matter from sugar ammonium nitrate the ash of yeast and water, is established, thus showing that carbohydrate matter is incorporated into the proteid in the course of its construction, and corre-

spondingly from the proteid the carbohydrate may be split off under certain circumstances to be used up in the tissues.

There is, then, but little evidence of synthesis of carbohydrates within the animal body, whether from the food constituents, or from any products of decomposition of tissue elements; such anabolic changes as do occur in these substances are of the nature of transformation among isomeric substances, or of condensation of various saccharids effected by various enzymes, each adapted to the special change required. This is in marked contrast to what obtains in plants, where a most extensive formation of starch sugars cellulose and allied substances is effected by the synthesis of much simpler bodies, of which carbonic oxide, and water, are the chief, or sometimes even of the elements themselves.

It is as glucose that that portion of the carbohydrate ingesta not converted into fat is ultimately used by the bioplasm, the stored glycogen being reconverted for that purpose, and the decomposition of the sugar in the muscle is effected by a ferment, which may be extracted in the muscle-juice, acting in conjunction, as Otto Cohnheim has shown, with a probable ferment body formed by the pancreas and thrown into the general circulation, in a manner comparable to the combination of enterokinase and trypsinogen already described. The final products of the destruction of the carbohydrates are carbonic acid and water, which are excreted by the ordinary channels, but there is reason to believe that among the intervening products of oxidation are lactic acid, alcohol, and aldehyde.

THE DIGESTION, ABSORPTION, AND DESTINATION OF FATS.

The fats of our food, derived as they are from both animal and vegetable source, differ somewhat, but not entirely, from the chief fats found in the body, viz. tripalmitin, tristearin, and triolein. However fine the emulsion may be in which they are presented to the intestinal mucosa for absorption, the molecules are still too large to pass into the epithelial cells on their way to the lacteals. It is almost certain that it is not in this form that the fats are absorbed; for, among other reasons, although fat granules and globules are abundantly to be seen

in the interior of the intestinal epithelial cells during digestion, they are never to be found in the striated border of those cells. Everything points to their being saponified—that is, split up into glycerine and fatty acids, the latter uniting with alkalies in the intestine to form soaps. These, which are moderately soluble, are absorbed together with the glycerine, to be reconverted into neutral fats within the epithelial cells, whence the particles and globules are conveyed by leucocytes into the lacteal radicles in the villi, finally to reach the thoracic duct. Under the most favourable circumstances it is only a part of the absorbed fat which ultimately reaches the circulation; a considerable amount is in some unknown way disposed of *en route*, possibly in the lymphatic glands (Schäfer: 'Text-Book of Physiology,' vol. i, p. 462). The effective agents in bringing about the saponification of the fats in the bowel are the alkaline bile and pancreatic juice, the latter of which contains a special fat-splitting ferment—steapsin. Although the exclusion from the intestine, either artificially or by disease, of these two secretions is followed by the presence of fatty matter in the stools, it is chiefly in the form of fatty acids that they are there met with, showing at least that the presence of these juices is not wholly essential to the fat-splitting, however important may be their influence in saponification, and still more in facilitating the absorption of these materials. It seems that some fat-splitting occurs in the stomach, though much less than what takes place in the intestine, but very little formation of soap, however, takes place in that organ.

Inasmuch as a great part, often the greater part, of the fats of the food differs somewhat in composition from the fats found in the body, it would follow that if the former be the immediate source of the latter they must undergo some change. Moreover it is by no means certain that such ingested fat as does correspond to that of the body directly goes to form the fat as it occurs in the tissues. That it may do so, however, appears possible from the fact that fats which do not normally occur in the tissues may yet be found there when administered with the food. Ordinarily fats form but a small proportion of the total ingesta, but they constitute a very considerable part of the body weight, and are the chief reserve store of potential energy. It is clear, therefore, that there must be

some other source or sources of this material than that contained in the food, and this is to be found chiefly in the carbohydrates from which it is well known the body fats are largely derived. Fat synthesis therefore becomes an important factor in nutrition. That there is a synthesis is obvious from what has just been said of the digestion of fats; the fatty acids and glycerine into which these substances are split up in the intestine for purposes of transference are recombined in the epithelial cells to form the fat which is in great part stored. It has also been found that dogs fed upon fatty acids only were nevertheless able to lay up neutral fats, the synthesis in this case not only combining the acid and glycerin, but also forming in some way not known the glycerine itself. It has been recently held that the fat-splitting enzyme or lipase which acts upon the fats in the intestine is the same agent that effects the condensation of the results of the cleavage, viz., the glycerine and fatty acid—an instance of what is termed “reversible action” (Hanriot, ‘Compt. Rend.’ 132, 1901).

As to the manner in which carbohydrates are converted into fats precise information is wanting, but it appears probable that it is the products of disintegration of the former that are synthesised. Among those products it will be remembered that lactic acid is prominent and that the same substance is formed from sugar of milk by an organism, and is the well-known cause of milk “turning sour.” Similarly butyric and caproic acid, lower terms of the fatty acid series, are formed from carbohydrates by another organism, lactic acid being first produced from glucose into which the carbohydrate is previously converted. The work of Leathes and others has shown it to be most probable that it is in the liver that the lactic is changed into butyric acid, as also that it is in the same organ that the butyric is built up into a higher term of the same series, and that from the carbohydrates of the food first converted into glucose, and possibly from the glycogen of the tissues, also converted into glucose, the several fatty acids, palmitic, stearic, and oleic, are in great part derived. Similarly in the seeds of some plants oils are formed at the expense of the starch. Most probably also the glycerine which with the acid forms the neutral fat is derived from the sugars. In alcoholic fermentation of sugar by yeast this substance is known to be formed, which rests an origin of a similar nature in the body.

It would be impossible in connection with the origin of fat from carbohydrates to avoid reference to the views so ably advocated, as the outcome of an almost lifelong experimental study of the subject, by the eminent physiologist, Dr. Pavy. According to him, a large proportion of the glucose resulting from the digestive changes into carbohydrate food is stopped from entering the portal blood-stream by the intestinal epithelium, in the cells of which it is converted into fat, and in that form enters the lacteals. Such as escapes is condensed into glycogen in the liver, which in its turn is normally transformed into fat and not into sugar. Dr. Pavy considers that it is by the protoplasm of the cells that this conversion is affected, and inclines to the view that the glucose becomes a constituent of the protoplasmic molecule previous to its giving rise to fat. I am not concerned to criticise this view; it is sufficient for my purpose to refer to it as indicating the very extensive transmutation of carbohydrate into fat that is held by some as normally taking place.

As to whether fats may be formed from proteids of the food or of the tissues, the most opposite views have been held. At the one extreme was Voit, who maintained that they were almost, if not entirely, so produced, and that even the carbohydrates did not give rise to them. The proteids, it was said, were so split up as to form a nitrogenous moiety which was thrown off as urea, the remaining portion consisting of carbon, hydrogen and oxygen only being stored as fat. That this was going too far was proved by the classical experiments of Lawes and Gilbert, by which the carbohydrates as being the chief source of the body fat was proved. It was still a question, however, whether any fat was formed from proteids, and up to the present day it has generally been conceded that there is. The teaching of Virchow in respect to the fatty degeneration of proteid tissues has gone far to maintain this view. Quite lately, however, this explanation has been called in question, chiefly from the experiments of Rosenfeld, and there seems to be good reason to believe that in all cases of so-called “fatty degeneration” the fat is really transferred as such from some fat depôt—adipose tissue or other—though admitting the possibility of a small amount being formed from the fat which is combined with the protoplasmic molecule or from such bodies as protagon and lecithin which are inti-

mately associated with the proteid, but that in no case is fat a product of proteid degeneration.*

The catabolic changes which the fat undergoes are those of oxidation into carbonic acid and water without so far as is known the formation of any intermediate bodies, the combustion being complete. Most of the disintegration takes place in the muscles with the liberation of heat and chemical energy, with transformation of the latter into muscular work.

* An interesting summary of the evidence bearing on this point is given in a paper by Dr. Christian of Boston in the 'Johns Hopkins Hospital Bulletin,' for January, 1905.

On the other hand, it is generally admitted that fat is formed by certain micro-organisms, especially the *B. tuberculosis*, to the large quantity of fat contained in which microbe its resisting power has been in great measure ascribed (Levene, 'Journ. of Med. Research,' 1904). Some experiments in this direction have been made with the *B. pyocyaneus*, which was found to form appreciable amounts of fat from peptones. This showed that free sugar could not be the source, and as there was no fat in the medium it could only have come from the proteids. It was found that there was more formed than could be ascribed to the carbohydrate nucleus of the proteids, and that consequently it must have been derived, in part at least, from some cleavage product or products other than the carbohydrate portion (Beebe and Buxton, 'Am. Journ. of Physiol.,' vol. xii, No. 5, 1905).

THE MEDICAL ANNUAL, 1905. (Bristol: John Wright and Co.)

THE 'Medical Annual' has now reached its twenty-third year, and has long been a trusted and valued friend. The volume for 1905 fully maintains, if it does not actually exceed, the high standard of excellence so long associated with this work, the only difference being that we are presented with a larger volume for the same price. In a short notice like this it is impossible to enumerate a tithe of the good things contained in this volume. A special feature is a number of plates of beautifully executed stereograms illustrating diseases of the eye and of the nasal accessory sinuses. In the review of the therapeutic progress during the year we are told that "during 1904 no striking therapeutical discovery has been made. A large amount of clinical and laboratory work has been done, and there has been the customary outpouring of new synthetic drugs. As a result, we are now the richer by several hypnotics, one of which (veronal) seems likely to prove of

considerable value; while isopral and neuronal have also been praised. Theocine is warmly recommended by various German observers as a reliable diuretic, and hebralin, a new urinary anti-septic, seems to rival urotropin." Serum therapeutics, organo-therapy, intra-venous therapeutics, radio-activity and electro-therapeutics have all been the subjects of much attention during the year, and are all adequately described. Of the surgical contributions Mr. Robson's article on diseases of the pancreas is good. It is mainly a condensation of his Hunterian lectures and forms a most useful brief account of this subject. Attention is drawn to Mr. Arbuthnot Lane's views on the operative treatment of chronic constipation, viz. short-circuiting the whole of the large intestine by anastomosing the end of the small intestine to the upper part of the rectum, and then dividing the ileum between the seat of anastomosis and the cæcum. Mr. Lane's teaching has also been adopted by the French surgeons, as we learn from the 'Semaine Medicale,' No. 52, December 28th, 1904. Amongst the medical sections those dealing with tropical diseases display the greatest advances in our knowledge. Those who desire a *résumé* of the latest views on human trypanosomiasis and its relation to sleeping-sickness, on the Leishman-Donovan bodies, on the nature of black-water fever and on the prophylaxis of malaria, cannot do better than read the accounts here presented. We confess that in contrast to the other sections of this volume we were disappointed on turning to obstetrics and gynæcology. In obstetrics we wished to ascertain the latest views on the subject of deciduoma malignum, and, although we turned up every heading we could think of, we could not find any mention of the condition. In gynæcology we desired some information on adenomyoma of the uterus, which is at present attracting much attention, having been first described in British literature in March, 1904. Again we looked for guidance in vain. Notwithstanding these omissions, we agree with the editor that although "the Annual is primarily intended as a work for rapid reference, we venture to think that the practitioner who will read it straight through will be well repaid for his trouble, and that there is no speedier way of attaining an intimate acquaintance with the present position of medical knowledge."

AN ATLAS OF DERMATOLOGY. By MORGAN DOCKRELL, M.A., M.D., Senior Physician and Chesterfield Lecturer on Dermatology to St. John's Hospital for Diseases of the Skin. (London: Longmans, Green and Co. 1905.)

THIS is an admirable example of the latter-day bookmaker's art. It comprises reproductions of coloured photographs of patients suffering from various skin affections, coloured illustrations of the microscopical appearances of sections taken from the same patients, and explanatory letter-press. The illustrations, both clinical and histological, are beyond all praise. Looking at the former, the reader is at once transported into the out-patient room of a skin hospital; examining the latter, he finds it difficult to believe that his eye is not at a microscope. Together they offer a presentment of each complaint which leaves absolutely nothing to be desired. It is a triumph at once of the artist's skill and of the reproducer's accuracy.

Of the letter-press we might be tempted to complain that it is somewhat scanty, were it not that the author forestalls criticism on this head by saying in the preface that verbal description has purposely been reduced to a minimum. "My object," he goes on to say, "has been to let the plates speak for themselves, and to write only so much as would help to elucidate the special points which each presents. I trust the explanations will not be thought too meagre."

Certainly the plates are well qualified to stand on their own merits, and, like the good wine, they need no recommendation; but the explanatory paragraphs, not of the plates, but of the general features of at least some of the diseases, might perhaps have been amplified without disadvantage. We nevertheless altogether sympathise with the author's implied view that it is better that there should be too little letter-press than too much. Many otherwise excellent works of this nature have been spoiled by verbal overloading.

On the rare occasions where he emerges from the region of ascertained and demonstrable fact into the loftier paths of theory, the task which Dr. Dockrell seems to have set himself is that of simplification. The bewildering and wholly meaningless names with which dermatology has been smothered have to a large extent disappeared, and the student is presented with classifications and distinctions which are both intelligible and intelli-

gent. If only for this reason the Atlas deserves a warm welcome from all those interested in the scientific study of the diseases of the skin, and when considered in combination with the really admirable illustrations, it may justly claim a foremost position in works of this kind.

SOUTH COAST AND EAST COAST HEALTH RESORTS.

A HANDY pocket guide is in course of preparation which will contain exactly the information which the traveller needs, namely, brief particulars of a large number of the most popular south and east coast health resorts, together with the fares and train services as officially supplied by the railway companies, and the week-end charges made at hotels, hydrog, and other establishments. Two editions of the book are to be issued yearly—the first at the beginning of May and the second in October. Mr. W. T. Perkins is the editor. It is intended to commence this useful volume with a description of St. Leonards and Hastings, and it is certainly wise to begin such a book with information about two such well-known and popular health resorts. We do not know whether Mr. Perkins will give any extracts from the reports of the medical officers of these health resorts, but to do so would certainly enhance the value of the volume. We have before us the Annual Report of Dr. A. S. Wilson on the sanitary condition, etc., of the borough of Hastings, and it affords to all who care to read it the most satisfactory proof that Hastings and St. Leonards are well guarded in every way. Medical men will be interested to learn that the only case of enteric fever reported in Hastings from August to the end of the year was that of a resident in the town, living in a perfectly sanitary house. Inquiries showed there had been no sickness in the house prior to November 4th, on which day a present of oysters was brought to the family of the resident. These oysters came from London, and on November 25th enteric fever was notified at the house. Samples of oysters were obtained from the oyster merchant in London, and evidence of sewage pollution established. Hastings is to be congratulated on the care bestowed on its public health, and it cannot be a matter of surprise that the place enjoys such a high reputation.

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* Specially reported for the Clinical Journal. Revised
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PANCREATIC CYSTS AND THEIR TREATMENT.*

By A. W. MAYO ROBSON, D.Sc., F.R.C.S.,
Vice-President Royal College of Surgeons of England.

GENTLEMEN,—The surgery of cystic disease of the pancreas is distinctly in advance of its pathology and much ahead of the surgery of the pancreas as a whole. Although cysts of the pancreas cannot be said to be common, they have to be taken into account in the diagnosis of any cystic tumour in the abdomen; for, as will be seen later, they may appear in various regions and may simulate many other diseases.

A search through literature reveals the fact that, excluding my own 12 cases, 160 cases of operation for pancreatic cysts have been recorded. Although larger numbers have been reported in various works, the above figure is probably as nearly correct as appears to be possible; for on verifying the records, the same case had sometimes been reported twice and in many the details were so meagre that the nature of the operation was not even given. Dr. Hale White has recorded the fact that in nearly 6000 post-mortem examinations at Guy's Hospital from 1883 to 1894, pancreatic cysts were only found in four cases, and one of these was a hydatid cyst.

It will thus be seen that cystic disease of the pancreas cannot be spoken of as common.

Seeing that simple drainage is usually sufficient to bring about relief or cure of the disease, surgery offers a poor opportunity for pathological intervention, since experience has shown that the patient's interests are best considered by a limitation of the incision to a size sufficient to empty and drain the cyst, and not sufficiently large to satisfy pathological investigation; hence it is highly probable that many reported cases of operation for pancreatic cysts have been for cysts of other organs,

* Delivered at the Medical Graduates' College and Polyclinic.

and it is an undoubted fact that quite a number of the cysts supposed to originate from the pancreas are pseudo-cysts.

The pathology of cystic disease of the pancreas offers too wide a field for discussion to permit of its being fully dealt with in this lecture, in which I want to consider chiefly the symptoms and treat-

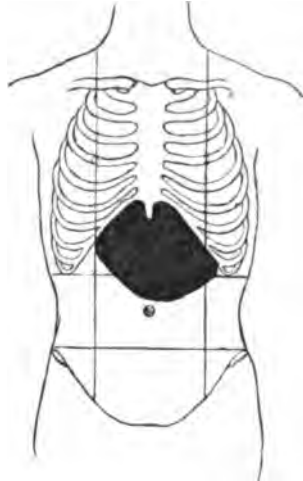


FIG. 1.—Traumatic pancreatic effusion into the lesser peritoneal sac, in a boy *æ*t. 2 years, knocked down by a cab.

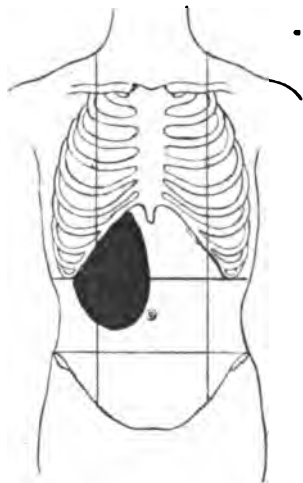


FIG. 2.—Pseudo-cyst of pancreas, formed around necrosed pancreas in a man *æ*t. 58 years. Patient in good health two years later.

ment, so that I shall only briefly mention a classification which I have found useful in considering treatment, without entering minutely into the pathology of the subject.

Cysts of the pancreas may be divided into false and true. The false or pseudo-cysts may be due to a distension of the lesser peritoneal sac, or to a

localised collection of fluid in the neighbourhood of the pancreas, both of which forms I have operated on.

True cysts may be due to retention from various causes, to parasitic disease, to new growths, as in proliferation cysts, and to hæmorrhage.

For practical purposes we may put aside several rare forms of cystic disease, seeing that the greater number of chronic cases that come under the care of the surgeon are due to retention of the gland secretion, the outflow of which is hindered in some way.

Senn found that ligature of the pancreatic duct did not result in the formation of a cyst, though chronic or intermittent obstruction might result in cyst-formation; just as ligature of a ureter or acute obstruction leads to atrophy of the kidney, though chronic obstruction or an obstruction of an intermittent character tends to the development of hydronephrosis.

The outflow of secretion in the pancreas may be hindered in different ways by obstruction of the excretory duct or by a combination of compression from without and obstruction from within. The most frequent cause is probably chronic interstitial pancreatitis in which compression and constriction of the ducts result from the development and contraction of connective tissue, thus leading to stagnation of the secretion. Wirsung's duct may be closed by gradual compression, as, for instance, in the development of a tumour along its course or by the gradual development of a duodenal tumour which compresses the orifice of the duct. Pressure by swollen lymphatic glands, or by adhesions near the head of the pancreas, or even by a gall-stone pressing on Wirsung's duct, may lead to stagnation of secretion and thus to cystic development.

I have seen a cyst of the pancreas to result from chronic pancreatitis due to ulceration extending into the pancreas from a chronic ulcer of the posterior wall of the stomach. The case was treated successfully by gastro-enterostomy and at the same time drainage of the cyst.

Large cysts may also be caused by obstruction within the duct, as, for instance, by a pancreatic calculus or by a gall-stone in the ampulla of Vater.

Doubtless some cysts are altogether independent of obstruction and cannot be accounted for by any of these explanations.

The symptoms produced by a pancreatic cyst vary according to the cause, as well as from the size and the seat of the tumour. They are at first dependent on the disease which leads to the cystic formation, though later the pressure exercised by the tumour itself on the neighbouring viscera has to be taken into account. Seeing that cystic disease is generally associated with some interstitial pancreatitis, either local or general, we may expect to find digestive disturbance with loss of flesh and pain at the pit of the stomach quite early in the disease, preceding by some time the recognition of the cyst at the surface. If the cause be dependent on some obstruction in the duct, we may expect to find paroxysmal pains accompanied by vomiting and followed by jaundice and wasting.

If the interstitial pancreatitis is at all extensive, there will be marked loss of flesh associated with fatty stools, azotorrhœa, and bulky, pale motions, and rarely the presence of glucose in the urine. In all the cases of pancreatic cyst that I have recently observed there has been a well-marked pancreatic reaction in the urine, indicating catarrh of the pancreatic ducts, or interstitial inflammation; and if this holds good for cystic disease of the pancreas generally, as I believe it will, I think it will form an important diagnostic sign in any case of tumour suspected to be pancreatic.

The Röntgen rays may also form a useful help in diagnosis in certain cases, as they may establish the presence or absence of pancreatic calculi, which, as I shall hope to show, are quite opaque to the X rays.

I have seen some cases of pancreatic cyst quite devoid of symptoms and where the patient has simply sought advice because of the swelling. On the other hand, I have also seen the tumour associated with severe pain and distress and with marked digestive and metabolic symptoms.

Before showing the anatomical relationship of the variously placed pancreatic cysts, I will show some slides of the normal pancreas and its ducts, and the microscopic appearance of advanced interstitial pancreatitis.

The physical signs of cyst of the pancreas can be best illustrated by diagrams, of which fig. 3 illustrates the importance of the peritoneal reflections from the pancreas on to the viscera, and by means of this diagram I think I can show how these reflections influence the ultimate position and relationship of the cysts.

It will thus be seen that the physical signs of cysts of the pancreas are by no means constant; and the diagrams I now show on the screen, of

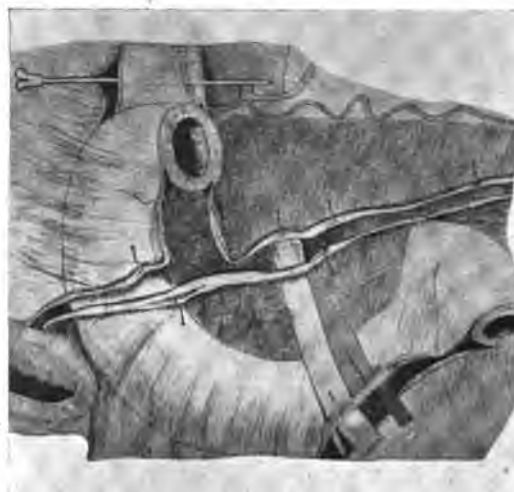


FIG. 3.—Diagram to show the relations of the peritoneal reflections of the pancreas.

cases that have been under my care, will demonstrate how utterly unlike in position, in size, and in physical signs the various tumours were, though in all the later cases metabolic and digestive symptoms enabled a diagnosis to be made.

For instance, a tumour springing from the anterior surface of the head or body of the pancreas

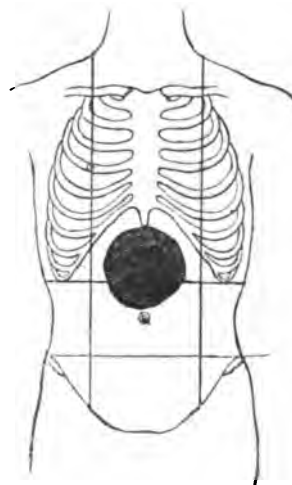


FIG. 4.—Cyst of pancreas treated by incision and drainage; man æt. 35 years; well seven years later.

above the transverse mesocolon will project into the omental bursa, and if small will bulge the stomach forward, or if large will either reach the surface

above the stomach, between it and the liver, or, pressing forward below the stomach, it will bulge between it and the transverse mesocolon. On the state of distension of the stomach will depend the extent of contact of the tumour with the abdominal wall. By distending the stomach with air through a tube or by giving doses of soda and tartaric acid in separate draughts the relation of the stomach to the cyst can be readily shown. If a cystic tumour arise from the pancreas to the right of the omental bursal reflection, it may make its way

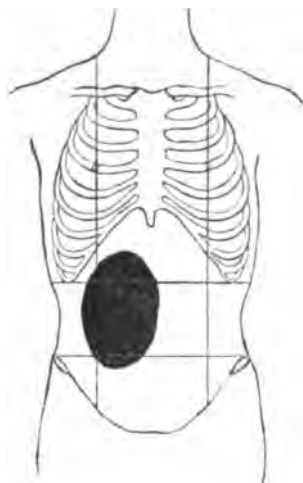


FIG. 5.—Cyst of pancreas treated by drainage; man æt. 53 years; short fistula; remains otherwise well.

forward to the right hypochondrium and simulate a gall-bladder or right renal or supra-renal cyst. Should a cyst arise from the posterior part of the head or tail of the gland, it may project either into the right or left lumbar region and resemble a cyst of the kidney. If a tumour springs from the head of the pancreas below the reflection of the transverse mesocolon but to the right of the mesenteric vessels, it will reach the surface below the hepatic flexure of the colon on the right side and may simulate a right renal tumour or a tumour of the cæcum or ascending colon, as the mesentery will prevent it passing to the left of the spine; but should it arise from the small portion of the processus uncinatus on the left of the mesenteric vessels, but below the attachment of the transverse mesocolon, it may burrow between the layers of the mesentery and simulate a mesenteric cyst, or it may bulge on the left of the mesentery and reach the surface below the transverse colon on the left of the spine, when it may resemble a left renal or ovarian cyst

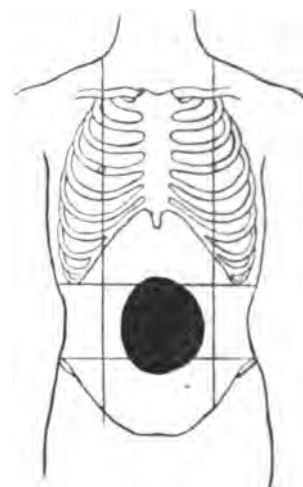


FIG. 6.—Cyst of body of pancreas; drainage; recovery.

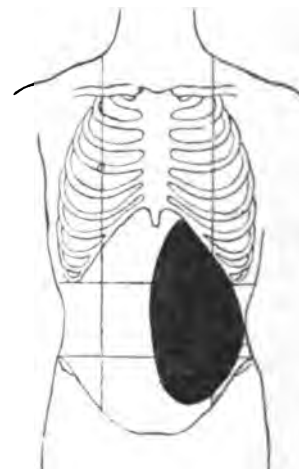


FIG. 7.—Cyst of pancreas from man æt. 37 years; drainage; recovery.

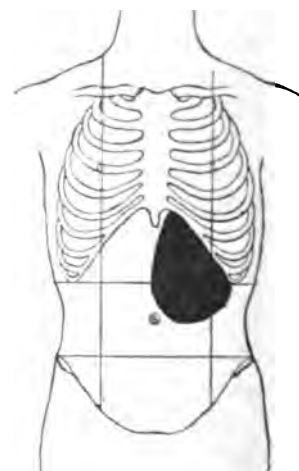


FIG. 8.—Cyst of tail of pancreas treated by incision and drainage; cure.

or a tumour of the descending colon or small intestine. A tumour arising from the body or tail of the pancreas above the reflection of the transverse mesocolon will pass upwards beneath the left costal margin and resemble a cyst of the spleen or of

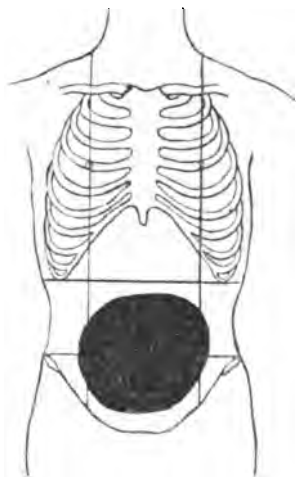


FIG. 9.—Pancreatic cyst resembling ovarian tumour.

the left lobe of the liver. I have seen a pancreatic cyst in this region opened and drained under the idea that it was a cyst of the spleen and I have seen a chronic abscess of the spleen opened and drained under the idea that it was a cyst of the pancreas.

Tumours springing from the pancreas on the left of the duodeno-jejunal junction, where the lower surface of the gland lies on the transverse mesocolon, have a tendency to press the great omentum forward and to project above the transverse colon, but they may grow downward toward the central region of the abdomen and arch the transverse colon or even project below it so that the colon lies above the tumour. The relationship of the colon to the cyst may be ascertained by distending the colon with air introduced *per anum*.

In an interesting case recorded by Dr. S. P. Phillips a thin-walled pancreatic cyst springing from the head of the pancreas completely filled the abdomen and presented the physical signs of ascites. The explanation of these variations, which may, and often do, lead to difficulties in diagnosis, is an anatomical one and depends on the site of origin of the cyst, which in making its way to the surface proceeds in the line of least resistance, and is thus influenced by the reflections of the peritoneum and the arrangement of the viscera overlying the gland.

Diagnosis.—A cyst of the pancreas may thus simulate a dilated and tense gall-bladder, a cyst of the liver, spleen or kidney, an omental or mesenteric cyst, an ovarian or uterine cyst, a cystic dilatation of the bile-duct, a supra-renal cyst, a tubercular peritonitis, or even an ascites. It is evident therefore that the presence of a cystic tumour alone, even in a characteristic position, will not justify the diagnosis of cyst of the pancreas, though as a rule the combination of symptoms together with the physical signs should leave little doubt in the majority of cases as to the nature of a tumour, even before an exploration of the abdomen is done. It used to be a favourite diagnostic method to explore by a hollow needle any cystic tumour; but it can be only under very exceptional circumstances that this aid to diagnosis would be justifiable, as it is by no means devoid of danger from perforation of an overlying viscus, *e.g.* stomach, colon, etc., or perforation of a large vessel or extravasation of the cyst contents. Not only so, but the examination of the contents will not always make the diagnosis certain. If, however, such an exploration be decided on, it is better to employ a small aspirator needle and at the same time to completely empty the cyst, which, if tense, would otherwise be liable to leak into the peritoneal cavity and produce disastrous consequences. While it is easy to say what will be the physical signs on percussion and palpation of a cyst appearing above, behind, or below the stomach or above, behind, or below the transverse colon, it will be seen that no one description can in any way guide the student as to the regular signs to be found in a pancreatic cyst reaching the surface.

The shape of a cyst varies according to the way in which it originates from Wirsung's duct or from the smaller canals within the gland. Thus there may be a rosary-like dilatation of the whole duct, as in a photograph taken from a specimen in the College of Surgeons' Museum, which I will show on the screen. Virchow termed this "ranula pancreatica," from its analogy to the well-known cystic tumour in the mouth.

If several small ducts are constricted, the resulting cysts may be small and multiple, especially if associated with diffuse chronic pancreatitis. In case of partial cystic dilatation of Wirsung's duct, large cysts may form which may be oval or rounded and may vary from the size of a fist to enormous sacs containing as much as 20 to 30 pints of fluid,

though the ordinary size of pancreatic cysts is something between that of an orange and a child's head.

The thickness of the cyst wall will vary according to the amount of pancreatic tissue entering into its structure, but in some cases it may be quite thin. It should not be forgotten that large blood-vessels may be encountered in the walls of the cyst. The lining of the cyst is generally smooth, but in some cases it may be roughened and show ridges and septa, the remains of original cysts; or there may be found adherent to the inner surface of the cyst clotted remains of profuse hæmorrhages. The contents of a cyst may resemble water and may give the appearance of a hydronephrosis having been tapped or the fluid may be thick and slimy. More frequently, however, the contents of the cyst are light brown or coffee-ground in colour. The fluid may also be syrup-like and gelatinous, or colloid or purulent. In one of my early cases it was yellowish-green, as if mixed with bile. It will thus be seen that the naked-eye appearances of the contents of the cyst do not always form a guide as to its nature, though a chemical analysis of the fluid often affords positive assistance, especially when, as occasionally happens, all the three albumen-digesting, fat-emulsifying and starch-converting ferments of the pancreatic juice are present.

It is, however, possible to find all the ferments absent and yet the cyst may be pancreatic, or to find one or other of the ferments only present: moreover the ferments may be present in pseudo-cysts.

The termination of pancreatic cysts in the absence of treatment varies in different cases. There is usually a steady progress of the disease that has caused the cystic condition—as, for instance, in the case of interstitial pancreatitis towards atrophy and its consequence, diabetes; but pressure symptoms may produce danger before this slower termination, or the cyst may rupture into the peritoneal cavity and cause death by shock or by peritonitis.

Rupture into the stomach or intestine has also been known to occur. In some cases pancreatic cysts have existed for many years without producing serious symptoms, though this is exceptional.

tment.—It is quite clear that medical treatment can be of no avail in the case of pancreatic cysts and that surgical treatment alone is available for their cure.

Incision and other forms of tapping are usually of little or no benefit, and ineffectual methods, which are

attended with more danger than is the operation of incision and drainage. They are, therefore, not to be recommended even for diagnostic purposes. Occasionally complete extirpation of the cyst may be performed, as in one of the cases under my care,

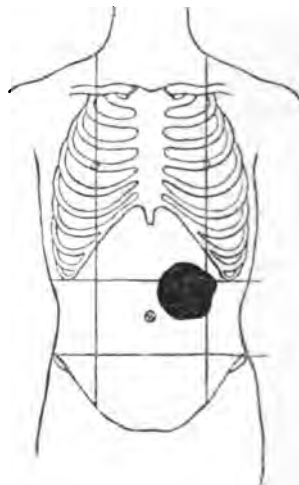


FIG. 10.—Cyst of tail of pancreas from woman æt. 38 years; drainage; recovery. Recurrence; excision of cyst; recovery.

where the tumour returned a few months after it had been apparently successfully treated by drainage; but the greater difficulty in performing excision, its impracticability in certain cases and the greater mortality attending it, as compared with the operation of incision and drainage, make it quite clear that drainage should always have a fair trial unless the circumstances prove to be very exceptional, as, for instance, in the case of a cyst of the tail of the pancreas, or in the case of a pedunculated cyst.

As to the situation for drainage, that will depend on circumstances. The tumour will usually be attacked most readily from the front at a point where it very nearly reaches the surface. Occasionally, however, as in one of my cases, it may be drained from the loin.

The following is a description of the operation usually performed: An incision is made through the parietes opposite the most prominent part of the cyst. When the peritoneum is opened, the finger can be employed to ascertain the relations of the cyst and its attachments. If the stomach is in front of the cyst, it will be better to displace that viscus upwards and to make a slit through the great omentum in order to expose the cyst wall; if the colon is in front, it may be displaced downwards. But no rule can be formulated, as the cyst must be reached in the most convenient way, and that can only be ascertained when the abdomen is open. By means of an aspirator the fluid is then drawn off and an opening made in the cyst sufficiently large to allow of a drainage-tube being inserted. The

tube may then be fixed to the margin of the incision in the cyst by a single catgut suture, and if the opening into the cyst is surrounded by a purse-string suture which can be tightened round the tube, all fear of leakage from the cyst into the peritoneal cavity is avoided. Any vessels coursing over the cyst must be avoided, but should an artery or vein be pricked it must be caught between pressure forceps and surrounded by a ligature.

The edge of the cyst may then be fixed to the aponeurosis by three or four sutures, but it is better not to attach it to the skin. The abdomen is then closed and if the tube is sufficiently long it will readily drain into a bottle containing some antiseptic fluid. If, on exploration, the cyst is found to have a narrow attachment to the pancreas and the adhesions are not too extensive, it may possibly be shelled out or the pedicle may be ligatured, but this is rarely feasible.

Some surgeons have suggested the desirability of fixing the cyst to the surface and only opening it after a few days when adhesions have formed, but this operation *a deux temps* seems to be quite unnecessary.

Statistics.—In the cases that I have personally operated on, one cyst was enucleated, recovery following; drainage was carried out in nine cases of true cyst, recovery following in eight; whereas of two pseudo-cysts, one due to traumatic hæmorrhagic pancreatitis and the other to necrotic pancreatitis, one recovered.

Of the 160 cases of operation recorded by others there were 140 recoveries; in four cases the ultimate issue was doubtful; in eight out of the 140 reported recoveries after operation the patients died subsequently—one from diabetes four months later, one from hæmorrhage one and a half years later, one from concomitant peritonitis seven weeks later, one from a zymotic fever a few weeks later, and three from causes not stated a few weeks later. Death is recorded as the result of operation in 20 cases. In five of these the cause of death and the time after operation are not given. One patient died in collapse, one died before operation could be completed (the next day), one died from "ileus," one died 18 days after operation (cause not stated), two died from shock, one died from gangrene of the pancreas, and eight died from peritonitis; one died at an interval not stated, one after 96 hours, one after six days, one after an exploratory incision, two after two days, one on the eighth day, and one on the second day. In 138 incision and drainage were performed, with 16 deaths, equal to a mortality of 11.6 per cent. In 15 excision was performed, with three deaths, equal to a mortality of 20 per cent. In seven partial excision was done, with one death, equal to a mortality of 14.3 per cent.

The evidence is clearly in favour of drainage, but the mortality should be reduced by at least one half.

ON NUTRITION AND MALNUTRITION.

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(Continued from page 399.)

A SURVEY of the foregoing account,* necessarily brief, of the changes undergone by the ingesta subsequent to their digestion in the alimentary canal suggest several points for consideration, first among which are the conditions attendant upon their absorption by the intestinal epithelium. These cells, to which formerly was attributed the sole function of permitting the passage of the diffusible gastrointestinal contents, are now seen to be possessed of powers of high metabolic value apart even from those, scarcely less important, which are concerned with the production of such a stimulus to pancreatic secretion as secretin, or the actual formation of a special fluid, the succus entericus, with its specific powers. Upon two groups at least of the digested food-stuffs do these tissue elements effect an important change, the proteids are broken up into much simpler substances—amido-acids and allied bodies—and the fats which, to permit of absorption, had been split into their constituent acids and glycerin are re-formed by them. Upon the glucose into which the ingested carbohydrates have been converted less unanimity of opinion prevails; whilst some consider the sugar passes through unchanged into the portal blood, others, with Dr. Pavy, consider that this is prevented by the change into fat undergone by the glucose in these same epithelial cells.

Another feature which stands out from our more precise knowledge of these processes is the relation of the liver to the several groups of materials brought

* I have not thought it necessary in this account to take into consideration the action of micro-organisms in the alimentary canal upon the ingesta. That they are not absolutely necessary to the maintenance of normal nutrition has been demonstrated, and that they may be directly or indirectly connected with the setting up of various forms of toxæmia as the result of their decomposition and putrefactive products is most probable. In health they perhaps supplement to a slight extent the ordinary digestive changes, but it is most likely that the greater part of the results of their activity are excreted in the fæces, or, after absorption, in the urine.

to it in the portal vein. In respect to few organs of the body have opinions so much varied from time to time as they have in regard to the functions of the liver; and although we cannot yet speak precisely as to what changes may be effected by the hepatic cells in the proteid products of digestion, if indeed any change be effected, we clearly recognise that glucose is stored partly as glycogen and partly as fat, the synthesis of the fatty acids having been shown to take place in this organ. From the catabolic side the liver also occupies an important position, since it is in that organ that the chief nitrogenous excreta are synthesised into that form in which they are finally eliminated.

The more accurate realisation of the metabolism of the food-stuffs leads to a wider conception as to the nature of the pabulum as offered to the living matter and the relative importance of the several constituents. Such proteid synthesis as takes place is concerned with some of the products of proteid destruction in the course of their elimination. But certain portions of proteid cleavage become utilised as fuel food, whether it be in carbohydrate form or as fat. From the former of these the chief bulk of the latter is constructed, but there is no evidence to show that the reverse takes place and that sugar may be derived from fats. Thus the residues of catabolism, whilst in part eliminated as waste, partly go to form those materials which play an important part in the economy, whether as internal or as external secretions, and are to some extent synthesised into the integral constituents of living matter.

Even yet more important is the recognition of the fact that the pabulum, whether proteid, fat, or carbohydrate, is ever in a state, as it were, of flux—now stored up, now transferred elsewhere, again, perhaps, to be stored before it undergoes its final changes, and is eliminated. To enable the laid-up materials to undergo this translocation they must be rendered soluble for conveyance in the blood or lymph streams, and this is done by the agency of ferments of the same nature as those the ingesta meet with in their process of digestion in the alimentary canal. The occurrence within the living cells—both animal and vegetable—of ferments which are capable of digesting the cells is almost, if not quite, universal. Such autolytic enzymes are proteolytic in action, and hence must be largely concerned in the ultimate proteid metabolism. If they be regarded as possessed of

reversible power, it would follow that by their means is maintained “a nitrogenous equilibrium within the cells, building up and breaking down proteids as circumstances require” (H. G. Wells: “On the Relation of Autolysis to Proteid Metabolism,” *Amer. Journ. of Physiol.*, 1904, vol. xi). Reference has already been made to the widespread occurrence throughout the tissues of erepsin. So, also, a glycolytic enzyme is to be found in muscles and elsewhere; and lipase, with its reversible power, has been met with in a number of tissues, especially where fat synthesis occurs, such as the mammary gland and adipose tissue, also, too, in the liver and blood.

THE RÔLE OF OXYGEN IN TISSUE METABOLISM.

In the course of these complicated changes, both anabolic and catabolic, the part played by oxygen is necessarily of considerable importance. The problem was the subject of an interesting discussion, introduced by Sir John Burdon Sanderson at the last meeting of the British Association. That it is a potent factor in those changes which constitute the disintegration of such tissues as muscle and nerve-centre in connection with the manifestation of their specific energies has long been a commonplace of physiology, and the resulting products of oxidation, such as carbonic acid and water, were known to be proportionate to the work done. More recently it has come to be realised that oxygen plays an important part in the constructive phases of living matter, though precise information on the point is still wanting. So far, however, it appears that for the restitution of the living molecule after the disintegration attendant on its transition from an inactive to an active state, oxygen is essential, “not as an oxidiser, but as a restorer of functional capacity.” It is requisite that the element should become a part of the bioplasm, intra-molecular, whereby the excitability of the tissue—muscle or nerve-centre—is increased, and the response to a suitable stimulus, expressed by the disintegration of the living substance with liberation of energy, is induced. It is in this latter phase that the oxidising function of the oxygen comes into play, contrasting with its integrating function that renders possible the explosion. For this anabolic capability Sir John Burdon Sanderson suggests the term “oxygenation.” Both in muscle and nerve-centre oxygen “acts as a predisposing,

not as an exciting, cause of functional activity," though playing an active part in the catabolism of these tissues. In the case of excretory glands the rôle of oxygen appears to be different; for during the activity of these organs, so far as it has been observed in the salivary glands, the pancreas, and the kidney, there is a large increase in the intake of oxygen without the subsequent liberation of a corresponding amount of carbonic acid. It is, then, the anabolic action of the gas which predominates in glands, as the catabolic does in muscle and nerve-centre. This difference in the part played by oxygen in the muscular and nerve tissues (grey matter) and in the secreting glands is further shown by the far greater production of heat which takes place in muscles, and the greater the excretion of carbonic acid and water the greater the amount of muscular work. Although oxidation is so important a factor of catabolism, it is not to be maintained that all the disintegration stages of the tissues (body-stuffs) are of this nature. The most complex, viz. the proteids, would seem to undergo certain preliminary decompositions in which oxygen plays no part; the splitting of these substances into urea and a non-nitrogenous portion which may or may not be converted into sugar is an illustration. Some of the first products of proteid (muscle) metabolism are doubtless oxidised at a later stage; but as already said, the catabolism of proteids is not one of complete combustion, as it is in the case of fats which are entirely converted into carbonic acid and water, and as is also the case with much of the carbohydrates, unless the greater part of these substances are converted into fat before oxidation, a fraction only being involved in the proteid synthesis.

The tissues differ among themselves very much in the extent to which they are possessed of oxidative power, and it has been shown that the solubility of certain substances in the tissues is affected by the presence or absence of oxygen. How important this is in respect to chemical interchanges between the cell and the materials presented to it will be obvious. There is much to show that the oxidations mostly take place in the nucleus of the living cell, which consequently becomes the chief seat of the syntheses that depend on their oxidations (R. S. Lillie, 'Amer. Journ. of Physiol.,' 1902, vol. vii).

THE PART PLAYED BY FERMENTS IN NUTRITION.

On looking over the whole series of changes, which I have merely indicated in outline, undergone by the ingesta from their first contact with the digestive secretions and their subsequent absorption, to their final presentation to the living protoplasm and their assimilation and breaking down, we are led to recognise that these changes are, so far as they are known, exactly of the nature of well-known chemical processes. By hydrolysis or decomposition with previous hydration, by condensation, by oxidation, and by reduction, the various alterations in the food-stuffs are effected. Now these processes are precisely such as take place in our laboratories under experimental conditions, and indeed many of the changes which I have described as occurring in the carbohydrates and fats, and to some extent even in the proteids, can be imitated at will in our flasks and test-tubes. But there is this great difference, that in our laboratory procedures to bring about these results strong acids or alkalies are required, a prolonged application of high temperatures or electric currents of great potentiality—conditions which obviously do not exist in the living animal or plant, and that indeed would be destructive of it; on the other hand, in the simplest living cell, alike as in the highest form of existence, these same changes are effected rapidly and surely without any such powerful agencies. It is this marvellous accomplishment of chemical change, both synthetic and analytic, that characterises the living organism and that permits us to use with becoming understanding the expression "vital" as applied to them, though it may well be that such a term is provisional only and may not be taken to affirm an essential difference from those conditions which govern non-living matter. At the same time, it must be admitted that altogether fresh methods of chemico-physical action are disclosed by the investigation of the syntheses effected by the living organism, and are not identical with those which take place in our laboratories.*

* "The testimony of pure chemistry cannot, *as it at present stands*, be legitimately interpreted into a direct negation of vitalism in any form. This negation may, and probably will, be more possible in the future, when our chemical methods have been made to approximate more closely to the vital methods." ('The Chemical Synthesis of Vital Products,' by Prof. Meldola, F.R.S., 1904.)

If now we seek for some explanation of the means by which the living thing effects these series of ascending and descending changes—the anabolic or constructive as well as the catabolic or destructive phases of metabolism, we find some clue in the conclusions drawn by numerous workers who have approached the problem from various points of view, starting not infrequently from previous knowledge that gave but little indication of the comprehensive and far-reaching results to which it has led. For many years it has been known that the activity of the several digestive secretions depends on the presence of bodies known as soluble ferments or enzymes—ptyalin, pepsin, trypsin, lipase, and the like—though but little has been ascertained as to the actual nature of these bodies, far less of their mode of action. Extended observation has demonstrated a widespread existence of these agents throughout the tissues, both animal and vegetable, and has shown, not only that they are secreted from the cells in which they are formed, and so enter into the specific secretions of the various secreting glands, but that they also may occur within the cells themselves and exert their peculiar activities in that situation—intracellular ferments. Among other consequences of this increased knowledge of these agents is to abolish the distinction hitherto maintained between the so-called inorganic and soluble ferments and organised or living ferments, of which the yeast plant may be taken as a type, since from its organism a substance has been expressed that brings about all the changes in the carbohydrates which the living cells themselves produce.

Great difficulty has been experienced in obtaining these bodies in even approximate purity, and so far their real nature and mode of action is largely hypothetical. There seems, however, good reason to believe that in many cases they are of the nature of nucleo-proteids and are derived from the chromatin of the cell nuclei,* but that between this substance

and the enzyme are intermediate stages which are successively formed in the cell substance or cytoplasm, the immediate precursor of the ferment being known as zymogen. Their activity is largely conditioned by their environment; they are destroyed beyond certain limits of temperature, and according to the degree of concentration of the medium in which they are will be in great measure the character of their results. The dependence of the formation of trypsin by the pancreas upon the circulation in the gland of a specific substance, secretin, and the further formation of trypsin from the zymogen by the action of another ferment (enterokinase) already referred to, seem to indicate some of the conditions of the origin and mode of action of these bodies concerning a knowledge of which we are but on the threshold. Their action is inhibited by the accumulation of the products of their activity, a removal of which permits a renewal of their effectiveness. Moreover, it appears to be pretty clear that for the due production of the specific changes which these enzymes induce, the cells must be adequately supplied with suitable pabulum, and, what is of great importance, the actual variety of ferment action depends very considerably upon the character of this pabulum, so that the same cell may give rise to different ferment actions. The adaptation of the gastric and pancreatic secretions to the particular requirements of different articles of diet, previously alluded to, serves to illustrate this statement. It was an investigation of this point in particular that led Dr Crofts Hill to the discovery of the reversibility of ferment action. The hydrolysis of starch into glucose by diastase has long been familiar to us, and it was also known that long before the whole of the starch was converted the action came to an end if the resulting sugar were not removed; if now glucose be added to the mixture a reconstruction of starch takes place, the enzyme rebuilding the molecule it had previously split up. It is difficult to over-estimate the importance of this discovery, advancing as it does so distinctly our conceptions of the intimate nature of living things. Within the unit of living matter we now conceive as existing numbers of these ferment bodies, ceaselessly effecting series of catabolic and anabolic changes. Immersed in the several bioplastic constituents of

* "This hypothesis," says Prof. Reynolds Green, "is considerably strengthened by the observations of Macallum ('Contributions to the Morphology and Physiology of the Cell,' 'Trans. of Canadian Institute,' i, 1890), by whom the nucleus has been shown to initiate the process of secretion and to excrete some material into the cytoplasm, which there undergoes further changes and ultimately enters into the composition of the zymogen, if it does not actually form the principal part of it. The source of this excreted material is the chromatin of the nucleus. Macallum has

also shown how intimately phosphorus is associated with zymogen from its inception in the nucleus till the time when the granules are fully formed."

the cell which are simultaneously undergoing both destructive and constructive changes, they bring about these decompositions and compositions, determined in the direction of their activity by the relative proportion of the products to which they have given rise. Only when the breaking-up products (conveniently designated by Crofts Hill *kata-products*) balance those of construction, or *ana-products*, is the activity of the cell in abeyance. "If either the *ana-products* or *kata-products* are removed from the sphere of action as fast as produced, the other products will be entirely transformed. In this way the reversibility of ferment action is sufficient to explain the synthetic processes of life which may and probably do occur in stages, so that the *ana-products* of one ferment are the *kata-products* of another, the final *ana-products* usually having a very low solubility" (Dr. Crofts Hill, Thesis for M.D. Degree, University of Cambridge). The reversible action of lipase in the disintegration and integration of fats in the course of digestion and absorption, which has been previously mentioned, is an illustration of this point. From this it would be clear that the older notions that ferment action was solely in the direction of decomposition, of catabolism, must be amended and the synthetic efficiency of these bodies be recognised. And not only is this apparent in the manifestation of their reversible action, but it is to be observed between different ferments, which thus become, as it were, complementary to each other. Thus the glucoside amygdalin which is extracted from almonds may be broken up by one ferment into sugar, hydrocyanic acid, and the essence of bitter almonds, whilst another ferment obtained from yeast extract can reconstruct these substances into the original compound.

Much has been said as to a constructive and destructive power of the living protoplasm as distinct from that of the enzymes which are formed from certain constituents of the protoplasm. The nature of these metabolic processes is in both cases the same, and it seems probable, though it cannot be affirmed, that it is by these specialised portions of the living matter, these extremely complex bodies, the enzymes, that the synthesis of the pabulum into the bioplasm is effected, and that so soon as this takes place by similar ferment action a decomposition is brought about, "giving rise to many residues of various kinds, some of which are

reincorporated with new material into the molecules of the bioplasm, while others are broken down still further and ultimately eliminated." "Not only," continues Professor Reynolds Green,* "does the substance of the protoplasm itself undergo these decompositions, but different materials in the cells are involved in them, and the residues of these are absorbed into, and incorporated with, the living substances in the same way as those which spring from its self-decomposition. We find that in many cells there is stored a reserve of nutritive material, not quite in a suitable state for immediate assimilation, but ready to form a nutritive pabulum when split up. Nor are such materials of use only as supplying nutritive material: by their decomposition a supply of energy is afforded to the protoplasm of which it avails itself in carrying out constructive processes."

Many are the theories that have been advanced to explain the mode of action of these ferment bodies, but not one can be said to be completely satisfactory. This remarkable property of setting up or accelerating chemical changes in substances, apparently without undergoing any material change or loss themselves, at once suggested a strong resemblance to similar activities long known to be possessed by certain metals, such as platinum, gold, and silver, when in a state of fine subdivision, or in a colloidal (spongy) form. Such power was called "catalytic," although no explanation is afforded by the term. A point of exceeding interest in reference to this is, that many of the fermentations which we recognise as dependent on the action of enzymes, such as the oxidation of alcohol into acetic by the vinegar plant, may be effected by finely-divided platinum, by which, also, cane-sugar may be inverted; and, as lately shown by Neilson ('Amer. Journ. of Physiol.,' 1904), the hydrolysis and synthesis of fats, which in the body takes place by the action of a ferment, lipase, may also be brought about by mere contact with platinum black. So, also, such toxic agents as prussic acid will equally arrest the action of the cell-formed enzyme and of the metal.

So wide is this ferment action, by which the various synthetic and analytic processes are performed, that within recent years a group of ferments have been recognised which are concerned in the

* 'The Soluble Ferments and Fermentation,' by Prof. Reynolds Green, D.Sc., F.R.S., 1901, p. 363.

transference of oxygen to the substance undergoing "fermentation." To these oxidising enzymes the name "oxidases" has been given, and their presence has been detected in both animals and plants. Here, again, is seen a familiar chemical process, which, in our laboratories, is effected by means of considerable heat, or of such reagents as would be destructive of living tissues, carried out rapidly and quickly through the agency of these highly complex bodies which are present only in infinitesimal quantities. The first of these bodies to be detected, now more than twenty years ago, is one known as "laccase," by which the lacquer varnish is produced; others appear to be concerned in causing the bouquet of wines; another takes part in the formation of indigo; and yet another, found in ripe olives, in the oxidation of the oil into oleic, acetic, and other acids. Recent observations, by the Committee of the British Association previously referred to, upon the localisation of these oxidases within the cell have shown that they are not components of the living framework of the cells, but are dissolved in the fluids that bathe that framework, and circulate in the cell-spaces and cavities. And, in view of the relation which these fluids have to the surrounding media, it may be more correct to regard these bodies, not as enzymes, but rather as oxygen-carriers, very much as hæmoglobin is.

The observation that certain animal tissues have reducing properties, such as being able to convert alkaline nitrates into nitrites, has suggested the possible existence of enzymes which could obtain the oxygen from somewhat stable compounds instead of from the atmosphere—in fact, reducing ferments.

Until quite recent years the function of a number of organs in the body, known as the ductless glands, thyroid, parathyroids, thymus, adrenals, and pituitary body, was a subject of profound mystery. Chiefly as the result of clinical observation alterations in their structure were found to be associated with very widespread tissue change and general functional deterioration in various directions. Without wholly excluding the idea that these organs may be partly concerned in the withdrawal of some toxic products of tissue waste, their influence on metabolism is attributed to the formation by them of internal secretions which are thrown into the blood lymph circulation and so distributed to the body.

The next step was to ascertain that this function of

internal secretion is also possessed by some of the glands that furnish external secretions and possibly also by other structures with which glandular functions, as ordinarily understood, are not usually associated.

That these organs or some of them exert a very important influence on the nutrition of the body is well known. The close association of the development of the reproductive glands with the growth of the body and the consequences of the removal of the thyroid and of the pancreas are familiar to us. In the case of the thyroid it has been demonstrated that when removed, or when its function is arrested by disease, the nitrogen elimination is much diminished and protoplasmic activity decreased, whilst the reverse condition obtains when the gland or extracts of it are administered. In contrast to this may be mentioned the effects of removal of three quarters or more of the total renal tissue, which is followed, as Dr. Bradford has shown, by an elimination on the part of the remaining portion of the organ of even more nitrogen than had taken place when both kidneys were untouched. This means an increased nitrogenous metabolism of the tissues, apparently excited by the removal of the influence of the kidney, suggesting that this organ produces a something which inhibits, as the thyroid produces a something which stimulates, the metabolism. Consistent with our general state of knowledge, we are led to suppose this something is of ferment-nature and that the internal secretions owe their activities to bodies of this class. Inasmuch as the normal influence of these organs is to promote oxidation and perhaps oxygenation in the sense just now defined, it may be that a specific use of these organs is to furnish oxidising ferments to the economy. Important as is the integrity of these organs for the general well-being of the individual, the range of their influence is far from being fully known, and it is very uncertain how far the results of experiments in connection with them conducted on the lower animals are applicable to man. There appears also to be some mutual relation in action among these organs of which at present we have only suggestions. Thus, for instance, the thymus ordinarily begins to atrophy when the sexual glands are becoming mature, and castration in young animals (cattle, guinea-pigs, and rabbits) arrests the wasting of the thymus, which continues to grow (J. Henderson, M.R.C.V.S.,

'Journ. Physiol.,' 1904). Dr. Noel Paton (*ib.*), reversing the experiments and removing the thymus, was led to conclude that "there is a reciprocal action between thymus and testes, each checking the growth of the other." Similar relationships have been observed in respect to other organs. If, as is supposed, the effect on nutrition of these organs is an expression of ferment action, it would seem that these ferments require for the manifestation of their activity the presence or absence of other like bodies, some being helpful as others are antagonistic.

THE RELATION OF LYMPHOCYTES TO NUTRITION.

In the consideration of the various factors engaged in maintaining the nutrition of the tissues mention must be made of one the mode of action of which is not understood in anything like completeness, even if the suggestions which have been made so far are correct. It is well known that among the normal white corpuscles found in the blood are some characterised by a non-granular hyaline appearance, with a single large round nucleus, which are known as lymphocytes. Of these there appear to be two varieties, which differ chiefly in size. Ordinarily the proportion of these cells is about 25 per cent. of the leucocytes, but during the process of digestion it is found that this proportion is very much increased subsequently to fall again to the before-mentioned number. So constant is this digestive leucocytosis that it is impossible to avoid the conclusion that it is in some way connected with the digestive process itself, or with the materials that result therefrom. It is in playing some part in the absorption of fats that this activity is assumed to lie, conveying it when digested from the columnar epithelial cells to the radicals of the lacteals. As in a measure confirming the nutritive importance of these cells is the undoubted fact of their greater number normally in the blood of children—at a time of life, that is, when the nutritive demands are greatest. And further, the greater activity of the adenoid tissue whence these cells are derived during infancy and childhood becomes even still greater under circumstances of impaired nutrition, as if by the increase in lymphocytes an effort was made to meet the deteriorating influences. It has been noticed that the diminution in the proportion of these cells to that which is characteristic of the adult occurs at

about the time that the function of the thymus begins to subside. Neither the thymus nor the spleen, which together comprise the largest amount of lymphoid tissue in the bodies of young animals, however, appear to be essential to nutrition, for either or both have been removed without interfering "with nutrition, blood-formation, growth, and development of the animal" (Paton and Goodall, 'Proc. Roy. Soc. Ed.,' 1904). The subject is one of which we really know but little.

THE INFLUENCE OF THE NERVOUS SYSTEM ON NUTRITION.

There is yet another factor which requires to be taken into account when endeavouring to form anything like a complete conception of the processes of nutrition. In the progress of organic development as the tissues and organs become differentiated and the functions specialised, there arises a demand, which grows with the increasing complexity of the organism, for some regulating, co-ordinating, and harmonising mechanism whereby the activities of the separate parts shall be combined most advantageously for the common good, to effect that union of action among the different organs as shall manifest most economically the life of the individual, and most completely bring the organism into relation with its surroundings. This complex of functions is performed by the nervous system. I scarcely need stay to furnish you with examples showing the influence that the nervous system has over the nutrition of the separate tissues and organs or of the body as a whole. In health the existence of this function is assumed, but that some such influence really is present is apparent from certain morbid phenomena which are associated with its perversion, and in many cases also with an obvious structural lesion of the nervous apparatus. The well-known distribution of certain cutaneous eruptions in special nerve-areas and the frequent morbid change found in the associated nervous tissue, such as herpes zoster, morphœa, "glossy skin," sclerodermia and others, atrophy of muscles and bones, bed sores, and perforating ulcers are but a few of the local results that we connect with a removal or perversion of this trophic influence due to disease of nerves or of nerve-centres. There are other states of malnutrition in which there is a more general wasting, but with which no special nervous change has

been hitherto detected; such an one is the condition known as *anorexia nervosa*, in which a universal and profound disturbance of the general nutrition is brought about, coupled with an almost complete abstinence from food. The degree of emaciation, however, far exceeds what occurs in professional fasters, but is nevertheless compatible with an often remarkable degree of muscular vigour.

It does not follow, however, that there are special neurones concerned with the discharge and conveyance of trophic impulses only, but rather that these are involved in those nervous influences which govern the functions of the various organs and tissues, and that "the function and nutrition of these physiological machines form together an inseparable unity" (Sherrington). It is unnecessary to remark that by regulating the blood supply the nervous system also influences nutrition. It may be conceived that this trophic control may be exerted directly in stimulating the functional activity of the tissues or, so to say, indirectly—as, for instance, by co-ordinating the mutual relationship of the tissues, one aspect of which we recognise as the effect of internal secretions, or by controlling that power of adjustment to the environment which is a fundamental property of living matter.

If we attempt to form any conception of how the nervous system affects the processes of nutrition, we should, consistently with the nature of the function which I have set forth, regard it as influencing the chemical processes within the cells. Direct structural continuity between the nerve-fibrils and the protoplasm of many glands and muscles has long been known to exist, which shows at least the possibility of the nervous impulses immediately affecting the equilibrium of the cell. And further, having regard to what we know of the nervous influence over the secretion of certain glands, we should not probably be far wrong in assuming that the anabolic and catabolic phases of nutrition are capable of being separately excited, though not necessarily by separate nerves. The increased and diminished action of the heart, induced by stimulation of the sympathetic and vagus nerves respectively, have been regarded by Gaskell as the result of the setting up of catabolic and anabolic processes in the cardiac muscle by these nerves, which, if a correct explanation—and there seems no reason to doubt it—illustrates the

conveyance of synthetic and analytic stimuli by separate nerve paths. The mutual relation of the up-grade to the down-grade changes in the living cell and their continuous activity would presuppose an equally continuous emanation of nervous impulses from the cells of the centres governing nutrition, and that there is such a constantly passing influence has been maintained by Sir William Gowers ('Lancet,' May 10th, 1890) and others.*

THE RELATION OF IONS TO VITAL ACTIVITY AND NUTRITION.

So far I have traversed ground that is in the main well assured—indeed, that in great part is familiar; and though there are many missing links in the chain of progressive changes which I have indicated to you, there seems good reason to believe that those links will be discovered, and that without any considerable upsetting of our present-day conceptions. The ascription to ferment action of the essential phenomena of nutrition does but give clear expression to many vague surmises that have long been held; and the fact that the intimate nature of these substances is but most imperfectly known, or indeed their actual isolation but scarcely attained, does not warrant our refusing to regard them as the important factors that they are generally assumed to be. Nor should the simplicity of the idea lead us to reject it. To ascribe the wonderful series of changes that build up that marvellous material bioplasm, with all its potentialities, out of materials whose composition is for the most part well known, to these ferment bodies, to realise that these agents are capable of a reversible action largely due to the character of their environment—in short, to regard life as a series of fermentations brought about by the progressive and harmonious interaction of these enzymes, though it may not be the ultimate explanation of vitality, helps us one step further towards its realisation, and does so in accordance with well-established data. But having gone so far, having acquired, so to say, another foothold from which to make further advance, speculation seeks for some means of explaining how it may be that the living

* See also papers by Wesley Mills, 'New York Medical Record,' October 22nd, 1887, and 'New York Medical Journal,' December 22nd, 1888.

matter liberates its activities which are thus regarded as dependent on ferment action.

Many years ago a distinguished physician, Dr. Ringer, working with portions of contractile tissues, *lia* and muscle, immersed in solutions of various substances, showed that the tissues continue to exhibit their contractility in certain solutions and in others, the most suitable being a solution of similar to those found in the blood-plasma. The real significance of these observations was not apparent, and for a time they appear to have been almost out of sight, until the subject was, a few years ago, further investigated by Prof. Loeb, formerly of Chicago and now of San Francisco. He found that the contraction is not manifested when the tissue is surrounded by solutions of such substances as urea, sugar, and albumen, which are not electrolytes, and that different contractile tissues differ in their degree of contractility according to the solution of electrolytes to which they are exposed. By varying the character of the medium he was able to start or arrest, quicken or slow, the action of heart placed therein, and could even make the limb muscle of a frog contract rhythmically like cardiac muscle. He went even further, and investigating that specific form of contractility which is represented by cell-fission and that results in growth, he found that he could initiate in the unfertilised ova of certain lower organisms by a suitable application of solutions of salts of certain strengths the cell-division that characterises fertilisation, and that is ordinarily regarded as the response peculiar to contact with the sperm-cell. Similarly the irritability of nerve-fibres has been shown by Dr. A. P. Mathews, a former colleague of Prof. Loeb, to be controlled by the nature of the solutions with which it is bathed. The explanation for these remarkable phenomena, which refer more closely than before the manifestations of life "to their physical and chemical counterparts or analogies" (Burdon-Sanderson), is to be found in the ionic theory of solution. In accordance with this hypothesis certain substances when dissolved undergo in the process of solution a more or less complete dissociation into their constituent atoms, or groups of atoms, each of which becomes at the same time charged with positive or negative electricity; such electrically charged atoms are termed *ions*. It has been known since the time of Faraday that certain substances in solution, through which an electric current is passed between two

electrodes immersed in the solution, also undergo a similar dissociation, and some of the ions are set free at the positive electrode, and are, therefore, regarded as carrying a negative electric charge, and hence called "anions," or negative ions; others are liberated at the negative electrode, and are, therefore, called positive ions or cations. And it is those substances when in solution which behave thus under the passage of an electric current, also undergo dissociation when entering into solution apart from the presence of a current. It is further found that the weaker the solution the greater is the percentage of dissociation into its constituent ions of the dissolved substance.* In solutions, particularly dilute solutions, these ions move freely about among the other parts of the liquid and diffuse through them, just as in a gas the individual molecules diffuse through the mass of the gas. And just as the moving molecules of a gas enclosed in a space tend to set up in that space a pressure upon its walls proportional to the number of them so contained, so the free ions in a liquid tend to set up in their movements during diffusion a pressure throughout the liquid and against the containing walls. If the containing walls be of porous membrane, this pressure tends to drive the ions through the pores. This process of passage through the pores is known as "osmosis," and the osmotic pressure exercised by the ions of any given kind in a dilute solution is proportional to the quantity of the ions present in the solution.

Now, as a rule, the mass of living protoplasm is separated from the surrounding medium, as the substance of the nucleus is separated from the cytoplasm by a membrane—cell-wall. Whilst this structure may well serve to retain within the cell the cell contents, including zymogens, ferments, and other colloidal bodies, it will readily permit the passage outwards and also inwards of those diffusible substances in solution which we have just seen in virtue of their solution have undergone ionic

* It is necessary to distinguish between dissociation and chemical decomposition. The ions of dissociation, though assumed to be free in the solvent, do not manifest their usual chemical properties. Thus NaCl when dissolved is supposed to split up into sodium cations and chlorine anions, but neither of these elements behave as they would if separately added to water; no decomposition of the water by Na occurs, nor is any free Cl detectable by its smell or its bleaching action.

dissociation. It is also obvious that the degree of concentration of the fluid with which the cells are bathed, and, adopting the terminology of Dr. Crofts Hill, of the ana- and kata-products of metabolism, will very considerably affect the nature and extent of the intra-cellular changes—that is to say, of the ferment action, that is to say, of the cell activity. The amount of water taken up or lost by a cell will thus influence very materially the direction of its action determining a synthetic or an analytic result.

I just now said that Loeb has demonstrated that muscle varies in its contractility according to the electrolyte with which it is surrounded; thus sodium salts favour contraction, as potassium and calcium salts inhibit it. But although this is the action of calcium it is nevertheless found that its presence in very minute quantities along with the sodium salt considerably prolongs the contractility of the muscle; with this circumstance it may be remembered, as suggesting the direction in which these salts act, that though the “influence of calcium is of doubtful value in the production of muscle-clotting or rigor mortis, its presence is most important in blood-clotting and milk-curdling” (Halliburton), all which changes are the result of ferment action upon which it may be supposed the influence of the calcium ions is brought to bear. In these cases the salt solutions are dilute; a concentrated solution of sodium chloride would kill a muscle immersed in it.

As giving some support to this theory of ionic action, Mr. S. W. Cole, as the result of experimental work on the influence of electrolytes on the action of amylolytic ferments (*Journ. of Physiology*, November and December, 1903) found “that the action is favoured by anions and depressed by cations.” This conclusion was justified by finding “that the salts of the strong acids accelerate the action of ptyalin on starch, the accelerating influence being the greater the greater is the strength (avidity) of the acid. With salts of weak acids there may be a retardation, the more pronounced the weaker the acid is, and especially prominent in salts of dibasic and tribasic acids.” Dr. A. P. Mathews also, finding that some salts stimulate as others depress nerve action, attributes the stimulant effects to the action of anions and the depressing effects to positive ions (*Science*, 1903, xvii, p. 729). In confirmation of this it is known that the electrical stimulation of a

nerve always proceeds from the negative pole (cathode) on making the current.

Much work has been recently done on the intimate nature of colloids, of which the proteids, that form the bulk of protoplasm, consist. Constituted of small granules held in solution, they are found to be capable of bearing an electrical charge, positive or negative—to be, that is to say, electrolytes, and amongst these bodies the ferments are to be included. “The salts or electrolytes in general,” says Professor Loeb,* “do not exist in living tissues as such exclusively, but are partly in combination with proteids. The salt or electrolyte molecules do not enter into this combination as a whole, but through their ions. The great importance of these ion-proteid compounds lies in the fact that by the substitution of one ion for another the physical properties of the proteids change (for instance, their power to absorb water and their state of matter).” “It is more than probable that one or both of these qualities may account for muscular contractility and protoplasmic motion. The agencies which affect these two variable qualities of the protoplasm are, first of all, certain enzymes. Almost equally powerful are ions in certain concentrations.”

Thus, then, the vital activities of the living cells would seem to consist essentially in the formation of ferment bodies which alone or in combination effect those integrations and disintegrations which liberate chemical energy, and that this by transformation produces muscular work, nerve force, and secretory function, the fundamental manifestations of life. That these enzymes do bring about these changes in such conditions of temperature and alkalinity or acidity as obtain in the body appears to be certain, and as an explanation of the activity of the bioplasm which elaborates these bodies there is postulated an ionic action on the part of the cell contents and their surrounding medium whereby charges of electricity of variable strength and character are brought into conflict and that from the play of ions the manifestations of vitality result. Such a conception of bioplastic activity leads more clearly to the realisation of the inseparable unity of function and nutrition, and that nutrition in its fullest sense is life itself.

* “Studies in General Physiology,” *Collected Papers*, 1905, pt. ii, pp. 544, 622.

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